

TECHNOLOGY DEPT.

# Midwest Engineer

SERVING THE ENGINEERING PROFESSION



DR. LILLIAN GILBRETH SPEAKS—PAGE FIVE

WSE MEETINGS—PAGE TWO

Vol. 5

OCTOBER, 1952

No. 5



## a good advertising ▼ medium

FOR ALERT ADVERTISERS

---

### Midwest Engineer

*because . . .*

- ▼ Circulation in America's industrial and residential heart.
- ▼ The direct path to specifying, purchasing, and industrial executives—those who say yes.
- ▼ Provides coverage in all engineered industries.
- ▼ Opens a live market area for machinery, fabricated products, industrial equipment, materials of construction, parts, tools, products and services.
- ▼ The mirror of the coordination of engineering and civic interests.
- ▼ Advertising rates are extremely low for coverage of this big market.

## Western Society of Engineers

84 E. Randolph Street  
Chicago 1, Illinois

MIDWEST ENGINEER  
Published Monthly  
BY  
THE WESTERN  
SOCIETY OF ENGINEERS  
AT  
2207 DODGE AVENUE  
EVANSTON, ILLINOIS

Ovid W. Eshbach.....President  
Charles E. DeLeuw.....1st Vice-President  
John F. Sullivan, Jr.....2nd Vice-President  
Allan E. Bulley.....Treasurer  
J. Earl Harrington.....Executive Secretary

*Trustees:*

Albert P. Boysen	George L. Jackson
Clifford B. Cox	Wm. R. Marston
Bruce A. Gordon	Charles L. Mee
Wm. B. Ferguson	Mrs. Dot Merrill
F. A. Hess	J. T. Rettaliata
Arthur W. Howson	G. Leland Seaton
H. P. Sedwick.....Past President	
Donald N. Becker.....Past President	
Leroy F. Bernhard.....Chairman,	
Publications Committee	

J. EARL HARRINGTON  
*Editor and Business Manager*

HAROLD K. EATON  
*Managing Editor*

GENERAL AND EDITORIAL OFFICES  
HEADQUARTERS OF  
WESTERN SOCIETY OF ENGINEERS  
84 E. RANDOLPH STREET  
CHICAGO 1, ILLINOIS  
TELEPHONE: RA NDOLPH 6-1736

The Society does not assume responsibility for statements and opinions in articles, papers and discussions appearing herein. All material must be submitted on or before the 10th of the month prior to date of publication.

Copyright 1952 by the  
WESTERN SOCIETY OF  
ENGINEERS

Permission is given for the reproduction of any material herein, provided due credit is given.

Single copy .....\$ .50  
Annual subscription ..... 4.00  
Foreign subscription ..... 6.00

Entered as second-class matter September 23, 1948 at the post office at Evanston, Illinois under the Act of March 3, 1879.

# Midwest Engineer

A Publication of the

WESTERN SOCIETY OF ENGINEERS

*Serving the Engineering Profession*



OCTOBER, 1952

Vol. 5, No. 5

## CONTENTS

WSE Meetings .....	2
Sewage Disposal .....	3
Dr. Gilbreth Speaks .....	5
The Impact of the Corps of Engineers .....	7
Educating Women for Engineering .....	9
Crerar Library News .....	14
Book Reviews .....	22
Personals .....	25
Obituaries .....	25
ESPS Listings .....	27
Advertisers' Index .....	28

## Cover Story

The picture on the front cover was taken on the campus of the Illinois Institute of Technology. Directly to the rear may be seen the Alumni Memorial Hall. To the left is the Chemistry building, to the right the Metallurgical and Chemical Engineering building.



#### **November 10, General Meeting**

Speaker: E. J. Donnelly, Partner, J. E. Grainer Company, Consulting Engineers, Baltimore, Md.

Topic: "The Engineer as Quarterback on the Toll Road Team."

Mr. Donnelly has been associated with the design and construction of turnpikes in several states including New Jersey, Ohio and Pennsylvania.

#### **November 12, Professional Women's Division**

Topic: "Progress Report on Planning for Chicago."

Speaker: Charles A. Blessing, chairman of WSE's City Planning and Zoning sub-committee. He is also Director of Planning for the Chicago Plan Commission, as well as President of the Chicago chapter of the American Institute of Planning.

#### **November 17, Annual Fall Dinner**

Topic: "The National Science Foundation: Its Organization, Progress and Policies."

Speaker: Dr. Paul E. Klopsteg, Assistant Director for Mathematical, Physical and Engineering Sciences of the National Science Foundation.

#### **November 20, Special Dinner**

Speaker: Joseph L. Kuharich, Head Coach of the Chicago Cardinals football team. Get together at 6:30, Dinner at 7:00 p.m. This meeting was especially arranged so that all engineering students from the Illinois Institute of Technology, Northwestern University and University of Illinois, Navy Pier, can meet WSE members, learn more about the Society, and have an entertaining time.

All WSE members are invited. Make your reservations as soon as possible.

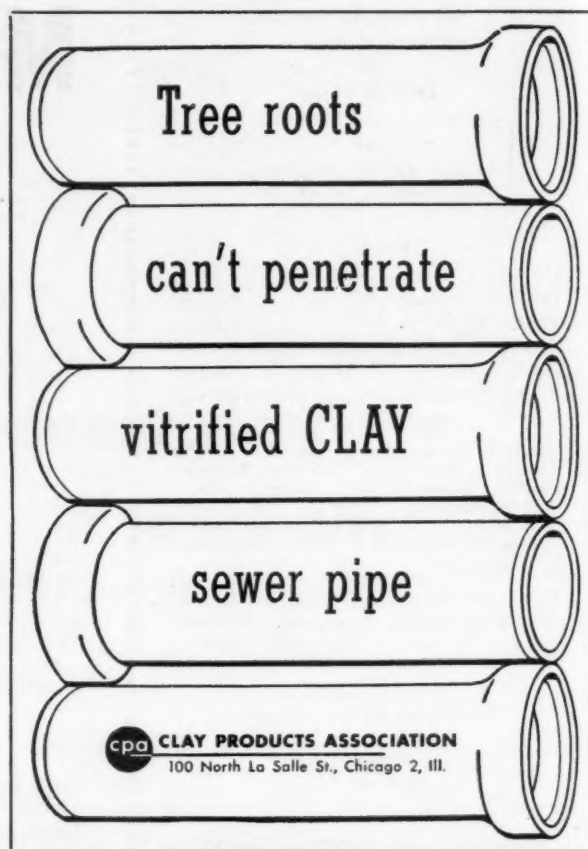
#### **November 24, General Meeting**

Topic: "New Developments in Concrete."

Speaker: A. Allan Bates, Vice-President, Portland Cement Association.

#### **December 1, Section Meeting**

Speaker and topic to be announced.



## **MORRISON CONSTRUCTION CO. ENGINEERS CONSTRUCTORS**

**SINCE 1925**

***Industrial Projects  
Public Utilities***

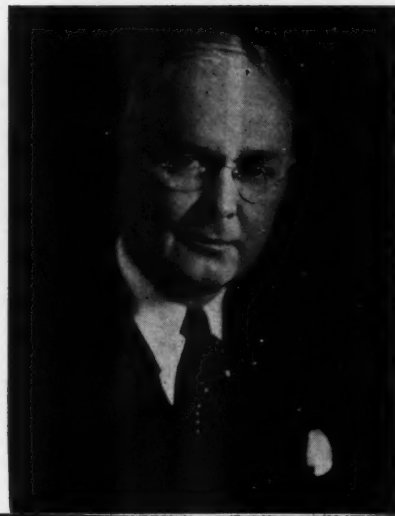
**TELEPHONES**

**CHICAGO ESsex 5-7680; HAMMOND Sheffield 5036**

**MAIN OFFICE**

**1834 Summer Street, Hammond, Indiana**

# Engineering In Sewage Disposal



By Samuel A. Greeley

I believe with all my heart that engineering in sewage disposal has greatly improved the welfare of urban populations. Water works have caused a more direct and obvious improvement, but without sewage works, the purification facilities in water works would be very high in cost and sometimes would not be sufficiently effective to prevent the passage of irritating and disease-producing organisms through the purification barriers which protect the consumers.

Furthermore, and to a considerable extent, the welfare of urban populations is improved by the beauty of clean waters and their safety for recreation. Thus, Engineers have and are contributing to the welfare of communities.

This contribution is, of course, ancient and worldwide. Wherever people have gathered into urban groups or communities, sewage disposal has become a necessity and Engineers have devised, designed, and constructed the necessary works. Reference need be made only to the Cloaca Maxima, the Great Sewer

of Rome, to make the picture vivid in your minds.

It would be futile at this time, I think, to consider the contribution of Engineers to the community through sewage disposal on a worldwide or even an American-wide basis. Fortunately, engineering in this field in the Chicago metropolitan area and in Illinois has been and is now of such a high order of achievement as to illustrate fully and ably these contributions. I have often been asked by friends in foreign lands for suggestions as to what places and things in sewage disposal they should inspect in the United States, and I have always said, "Come to Chicago and from there visit some of the Sanitary Districts in Illinois (and in northern Indiana) and you will have seen the best."

This suggestion, which I believe to be true, will not be accepted without challenge by practising Engineers in New York City and in some other cities who regard their accomplishments as having contributed much more to the community through sewage disposal than have Chicago Engineers. As in other things, the competition between these cities is

sharp and the sewage disposal works in each have been highly successful. Therefore, this discussion is directed and dedicated to the practicing Engineers in the Chicago area and in Illinois, who, through sewage disposal, have made indispensable contributions to the welfare of urban populations.

Sewage disposal is a proper term in the title as it means all the works and facilities to convey sewage from its origin in homes and factories to its discharge in an adequately purified or treated condition to the receiving waterways. The term, thus, includes house connections, various kinds of sewers, pumping stations, and treatment (or purification) works.

The major objectives of sewage disposal in the Chicago area, in addition to removing sewage from premises, have been the removal of sewage from Lake Michigan and the prevention of objectionable conditions in the waterways of the area. In Illinois, the main objective has been clean streams.

Three physical characteristics of the region have had important effects on the

(Continued on Page 11)

Mr. Greeley gave this talk before the Western Society of Engineers at the Society's Headquarters on September 4, 1932. Mr. Greeley is a partner in the firm of Greeley and Hansen, Chicago.



# NOVEMBER 17

## The Annual Fall Dinner

at the

Furniture Club of America

667 N. McClurg Ct.

*Featuring*

### DR. PAUL E. KLOPSTEG,

Assistant Director, National Science Foundation

Prominent Industrialist and Scientist

Author of Many Articles and a Book

Formerly: President of Central Scientific Company,

Director of Research at Northwestern University

and Chairman of the Board, Argonne National Laboratory

*on "The National Science Foundation:  
its Organization, Programs and Policies"*

**FELLOWSHIP AT 5:30**

**DINNER AT 7:30**

*Send in your  
Reservations Today*

**Tables assigned upon receipt  
of your reservation and  
check.**

MAIL THIS FORM TO THE WESTERN SOCIETY OF ENGINEERS  
84 E. Randolph St., Chicago 1, Ill.

Name: .....

Company: .....

Address: .....

**TICKETS \$4.50**

(including tax and gratuities)

No. of Tickets..... Separate Tables Assigned for 10 Tickets

Make checks payable to The Western Society of Engineers.



# Dr. Gilbreth Speaks

on

## Some Problems

That

## Challenge Engineers Today

Madame President, Madame Chairman, honored guests, fellow members, ladies, and gentlemen. It is a great pleasure and privilege to me to be here with you this evening, as our two days of meeting draw to a close. Perhaps my function is to look into the future and try to see what we are going to do with all we have been able to gather, as we have been together.

So many fine things have happened—the companionship, the warm hospitality. You have already heard appreciation expressed for these. But perhaps the finest of all was the program which was put on: the papers that were presented which not only sounded fine as we listened to them, but which I am sure are going to read equally well. I hope that they may be made available to us in print. The fact that one of these papers was presented by someone from our

neighboring country of Canada, and by my own friend Elsie MacGill, is an indication, I think, of the warm feeling extending across the boundary. And it is a cause of great pleasure to us that we have some guests from overseas with us tonight. I think we are all conscious, as we welcome them, that while they may have some things to learn while they are here, they have many things to teach.

I enjoyed, and I know you did too, every word of Dean Eshbach's speech, which gave us directives as to some of the things we should do, and advice about our relationships within the groups to which we belong. The fact that we are engineers does make us kin with so many people all over the world. The fact that one meeting which is a part of this Centennial is a Western Hemisphere meeting with the three countries on this side of the world which are part of the International Management group participating—Canada, United States, and Brazil—is an indication of exactly what I mean. And I think that engineers who may not all speak the same language, in a way certainly do have a

common language, which means that we can make our own peculiar contribution to the United Nations and to united friendship everywhere.

Now let me speak for a few moments on "Some Problems which Challenge Engineers Today." Every word of that title is significant. I can really only review and emphasize things we've already spoken about, for so many of those things have already been said. One of them which impressed me very much was a remark made this afternoon by one of our speakers that we must be able to define "engineering." We know that one definition says "Engineering is the use of the resources of nature for the benefit of mankind." The Dean has already spoken about the resources of nature, and our need to know them better. Even in that early definition we did stress that this was for "the betterment of mankind." When the definition is recast, it says "the resources of nature and human nature for the benefits of mankind." But of course we have to supplement this,

(Continued on Page 6)

Dr. Lillian M. Gilbreth is popularly famous as a lead character in the book, *Cheaper by the Dozen*. She is also an Industrial Engineer and President of Gilbreth, Inc., Montclair, New Jersey. Dr. Gilbreth presented this talk before the Society of Women Engineers on September 3, 1952, at the Headquarters of the Western Society of Engineers.

(Continued from Page 5)

and I think the world looks to engineers as a group of scientists, as people who are willing to look for facts, and face facts, and to be guided by them whether they fall in line with their preconceived notions, or whether they specially like them or not. So when we come to this question of problems, we find them distinctly tied up with the engineers' responsibility. And perhaps as we go on stating problems as simply and clearly as we can, then trying to face them and solve them, we shall work them out in the minds of people, and that may be even more important than the dictionary's definition of what an engineer really is.

The Dean said that engineering was a discipline, or at least that was a part of his description of what we must strive for. And I think that is a valuable part, and hope to emphasize that it is a discipline, and it's something more, really, than acquiring a certain amount of information. It has character traits in it. That means, I think, that it is supposed to penetrate into every activity of our lives. We all have to be individuals. I think in today's emphasis on group work and on team work, we sometimes forget that we can't just take a group of individuals, who haven't done very much, or thought very much about what they could do, and put them together and get something. That would mean that not only is the group activity a fine thing, but that the people who participate, all of a sudden in some mysterious way become perfectly competent individuals, physically fit, mentally alert, emotionally serene, socially adjusted, even perhaps sartorially smart, which seems to have a part in the social adjustment, sometimes more of a part than we may think.

Besides being individuals, of course, we're members of homes and families. We are expected to take into that home and family relationship any of the discipline and the thinking and the stating of problems, and the facing of problems which engineering training may give us.

Then we're volunteers. We find more and more of us in volunteer activities. We're called upon to come in. Sometimes we don't feel very effective. Sometimes I'm sure we're not very effective, but at least we try to take from our experience and utilize in these activities the opportunities we've had. And the re-

sponsibilities we've had help us to give job descriptions, job demands, easier and better ways of doing things, the appropriate use of materials and machines and the relationship of this use to developing the human element.

Of course we have this responsibility also in our citizenship work. I think the day has passed, at least I hope it is passing, when an engineer will say "I have enough to do in my own profession, in my own specialty—let other people do the citizenship work." Our medals, our appreciation, or drafting of people with engineering or scientific training into the citizenship jobs is an indication of the opportunity of service.

The talk I'm trying to give really isn't the kind of talk one would give to a non-engineering audience because it may seem to take to ourselves too large a share in responsibilities and in the ability to meet responsibility. But we are, in a way, a family group, and this is a family occasion, a very warm friendly occasion. We're trying to share what we feel we do have, to look at our assets and our liabilities, but especially to see how we can meet needs wherever we see them, and of course, primarily to look at our own engineering jobs.

Now the first thing may seem very far afield of what we expect engineers to do, but there is an increasing demand these days, that we emphasize and stress the spiritual values in life. We are not a very articulate group at best, either in speaking or writing. As a people, I think we are not very articulate in the spiritual field. And yet we do know that unless we accept our share in expressing ourselves and standing up for what we feel the spiritual values are, we are going to be rated as a materialistic people, just because we have been so inarticulate. Yet as you look at our codes, at our standard of ethics, at our policies in which we try to put our belief in spiritual values into action and express them in the field of human relations, you will know that at least we are making some attempt. I think that as a profession we are very fortunate, as are the legal profession and the medical profession, that we do have the support of codes. Our standards of ethics, I sometimes feel, are at times more wishful thinking than drawing from actual experience

out on the job. Surely no one can have talked to young people in the engineering field, in college or out, who does not know that sometimes the young are bitterly disappointed when they go out and come back and say, "Why did you try to teach us that these were the ethics of business and industry when where we are, these ethics do not seem to be observed." And it isn't easy to say, "You have been unfortunate in the contacts you have made and the places you have seen. There are large companies and there are small companies all over this country and all over the world who do have high standards and do live up to them. It's your right and your responsibility to try to live with high standards—with difficulty if you're alone where they do not prevail, and with pride and honor if you're in an organization where you can go out and say 'The policies of my company mirror very high standards'."

I think it means something that in the resurvey of business and industry at the end of the war, the very first thing we did was to go over the policies and to ask that every organization check: Are the policies simple, clear, and available, up to date, in print, and may anybody, at any time, ask to see them? Because, of course, back of those policies lie beliefs, and from these policies grow standards and directives. It's a very concrete and real job, mine and yours, as we go back to our jobs, to make absolutely sure that that sort of check-up is going on wherever we are.

Another thing which is very much talked about today has to do with training, and the dispute as to whether technical adequacy or knowledge of human nature is the more important for an engineer. I never could see why the two should be considered mutually exclusive, or why some people seem to think that if you dilute your technical adequacy a little, your human relations or your knowledge of human relations will grow at the same time. It seems to me that we must stand for technical adequacy which increases constantly, based on pure research and applied research, and a continuous raising of standards. That has always been a pe-

(Continued on Page 16)

# The Impact of the Corps of Engineers

## on the Progress of the Nation

### During the Past One Hundred Years

By Lt. General Lewis A. Pick

I esteem it a privilege to address you. I am glad to help celebrate the Centennial of Engineering in America. It is fitting and proper to commemorate anniversaries. This is the 100th birthyear of our oldest engineering society, and so I consider this occasion altogether auspicious.

I note that all societies of engineers are represented here today. That is as it should be, for all our engineers helped to build America.

I sometimes wonder whether the average citizen thinks of us in that role. To him, perhaps, the nation has been built by law givers and statesmen. To him, I fear, we engineers are just diggers of ditches and hewers of wood.

Now this is not to be wondered at. The engineer is not noticed on the crowded stage of American affairs. He takes a curtain call only once in a great while.

Rarely is he in the spotlight. The applause is not for him. More than likely it is for the statesman, or the heavyweight champion.

Usually the public neither knows the engineer, nor discusses his performances. His work is behind the scenes. The public gets a peep at him only in the wings.

But a survey of the last century's developments reveals his true stage ability.

He stands forth as the greatest producer on the stage of American affairs. The American engineer has provided most of the planning. He has pioneered

the exploring. He has produced the intricate machinery. And he has operated it. In short, he has held the play of our American Civilization together.

The American engineer actually has guided the course of events in the United States. First, he chartered the way. Then, like the ancient giants who piled mountain upon mountain, he built a nation of Olympian stature.

In doing these things, he has contributed to the well-being of the American people. That is the consummation most devoutly to be wished for by every engineer.

It was said of St. Christopher Wren—"If you seek his monuments look around you."

That could be said of the American engineer.

Engineers have harnessed the forces of nature which God gave us. Their brains, their hands, their machines have been everywhere.

They have lighted our city homes. They have lighted our farm homes. They have constructed our roads, our railroads, our bridges. They have built our ships. Those ships now circle the globe—upon and beneath its waters. Engineers devised our airplanes to rival sound in their speed. They have brought distant music, speech, and events to our hearthsides.

And finally, they have given us a power that challenges our beliefs. This power has potentialities for health and happiness beyond our comprehension. Provided we have the wisdom to control it. Provided we have the conscience to divert it to the causes of peace. At long

last engineers and scientists have produced the atomic age.

Such contributions to the social welfare are worthy. They justify American engineers' pride in their leadership today.

The greatest contribution our engineers have made to social evolution is their control of the forces of nature.

Only in the light of history can we comprehend this engine-made America of ours.

Never were colonizers blessed with opportunities as those who settled the United States.

They found a continent of unlimited resources—ready for the taking.

It was a land of mountains and fertile valleys. It was a land of lakes and rivers.

This land stretched from ocean to ocean, westward. Its climate accommodated their way of life.

Its bays, sounds, and inland seas afforded protected harbors. It was unrivaled in its mineral supply.

It was a land on which God had laid lavish hands. It was His richest land of opportunity.

Its only need was a breed of men with power to take and to contain it.

Well, it was taken. It was contained by such a breed of men. And today we call it America.

I say that it took men of power to win this land of ours. It took men of power to develop this giant among nations.

But what kind of power did these men have? Of what elements was it compounded?

(Continued on Page 8)

Lieutenant General Pick, Chief of Engineers, Department of the Army, and author of the "Pick Plan for the Development of the Missouri River Basin," among many other activities, gave this talk at the Centennial of Engineering in Chicago on September 13, 1952.

(Continued from Page 7)

Well, they had to have a power of special ingredients.

No weak-timbered people could have built a nation of America's Olympian caliber. They could not have done it in such a short time. They could not have done it from such a wilderness.

The power that built America was compounded of three elements. Let me name them to you with earnestness:

The Power of Engineering Character; the Power of Engineering Leadership; the power of Engineering Knowledge. All employed to the creation and fulfillment of American Destiny.

Gentlemen, these three powers represent the hard core of American engineering. These we must preserve if we would keep what we have built. Let us today evaluate them. Character, Leadership, Knowledge—but the greatest is character.

For the moment, let us turn back the pages of history. Let us see what the people were up against 100 years ago. What were they heading into?

Let us review briefly the State of the Union as of September, 1852.

Significantly, the people then were in much the same temper as today. Much political heat was being generated. The American people then, as now, were heading into a Presidential election.

President Millard Fillmore was still in the White House. He had made Daniel Webster his Secretary of State. Henry Clay was but two months in his grave. Webster would be in his grave within a month.

Commodore Matthew Perry was on his way to Japan. He had with him a few warships and a letter from President Fillmore. The President hoped his letter would open the Japanese ports to American trade and it soon did.

Here in Illinois, Stephen A. Douglas was assuming the mantle of Clay as the "Great Compromiser."

Down State in Springfield was a lean, lank, ex-congressman destined "for the ages." His name was Abraham Lincoln.

In September, 1852, military engineers were spearheading the activities of a growing, expanding nation. In Washington, D. C. two granite wings, and a Dome for the Capitol were taking form. Washington Monument was reaching for the skies.

Battlemented towers of a building

called Smithsonian made silhouettes strange to the Capitol's vision.

Up the Potomac, a water conduit was winding its way toward the city. This Washington Aqueduct would contain the longest single stone arch bridge in the world. The water system it carried would still be in use in 1952.

On the Anacostia, at the other side of the City, plans for a Washington Navy Yard were taking form. Washington City was in a hustle and bustle of construction.

Emigrants by the thousands were rushing westward. For the continent was now contained—from the Atlantic to the Pacific.

"Fifty-four Forty or Fight" had been dropped for a showdown with Mexico. Our southern boundary now ran from the Rio Grande west to the Pacific.

Thousands of emigrants were filling their pockets with gold out in California. The harbor at San Francisco was being cleared and fortified.

Coastal surveys were underway from San Diego to British Columbia. Westward the Course of Empire had taken its way. The western domain was ready for development in 1852.

In the Eastern states there was a network of canals and railroads. They had practically replaced the stage coach. Telegraph lines were multiplying daily. One had actually crossed the Missouri. There was talk of laying one on the bottom of the Atlantic.

Shortly before 1852, New York City had decided she needed help. She wanted her harbor to lead the world. The Congress agreed to help. And so, in 1852, there was engineering activity in the East River. The Army Engineers were removing the rocks at Hell Gate.

In September, 1852, there were echoes of cheers for American engineering. In August, an American built steamship had won the blue ribbon. She had crossed the Atlantic in record time.

The fact is interesting to us this year of 1952. It has taken us 100 years to win that blue ribbon again. Our American Liner, "The United States," recently made the crossing both ways in unprecedented time. Today Columbia again rules the waves.

And that leads me to think upon the mutability of human affairs. I ponder the brevity of a mere one hundred years.

When we look back over the last 100 years of engineering progress, it seems

a long time. Yet it is little more than the span of one lifetime.

More amazing accomplishments have marked this one century than all previous history. And most of them are the result of engineering vision.

In 1852, this bee-hive city, where we gather, was a pioneer town. In that year three new railroads were moving outward from Chicago. The Chicago and Elgin was the first railroad expanding westward from the city. The Michigan Southern and Michigan Central would soon connect the Eastern Seaboard. Chicago was fast becoming a magnet for business enterprise—a growing metropolis.

Thus we set the national stage of September, 1852, for the century of engineering accomplishments we here commemorate.

And that, gentlemen, brings me to the theme of my discussion—the impact of the military engineer on our nation's progress.

By 1852 the Corps of Engineers already was steeped in traditions.

Army Engineers had been active in American affairs since 1745. Colonel Richard Gridley, the Army's first Chief Engineer, had led the engineers who reduced the French Fortress of Louisbourg in 1745. He was the Colonies' engineer in the later French and Indian War, and his engineers climbed the heights and stood with Wolfe at Quebec.

When the Continental Congress authorized a Chief Engineer in 1775, Gridley got the job. By that time he was nearing 70, but he planned the fortifications which forced the British to evacuate Boston.

When Washington became President, he reorganized the Corps, which became the Corps of Artillerists and Engineers, and which existed until March 16, 1802 when the present Corps was established by a Congressional Act establishing also a Military Academy located at West Point, New York. The Corps and Academy were one and the same.

The Military Academy continued under the management of the Corps until 1866. During those 64 years, the Superintendent was an officer of the Corps of Engineers, and the Superintendent's immediate superior officer was the Chief of Engineers.

The Academy at West Point was pri-

(Continued on Page 12)

# Educating Women for Engineering

By LOIS GRAHAM McDOWELL

If I had been given the privilege of speaking to you from this platform ten years ago, I should have been far less certain of the acceptance of women in engineering fields than I am today. In fact, I should have been, at that time, myself beginning a search for a vocation which would prove to be intellectually satisfying, physically possible, and potentially rewarding from the standpoint of professional recognition. I would have found less encouragement in my quest for guidance in choosing an area for specialization. The shortage of technical personnel has focused the attention of those who prepare and those who need engineers upon new sources of supply.

It has frequently been suggested that the curriculum required for women engineering students should be different from the standard engineering curriculum. Apparently there is a popular belief that there are certain phases of engineering which women cannot handle, or that only limited fields are open to women engineers. I suspect that these opinions are the inevitable result of growing pains as women press forward to obtain recognition in new areas. As women become successful in more occupations, more bars to wider endeavors fall before them.

Lois Graham McDowell is an Instructor and the Assistant to the Director of the Department of Mechanical Engineering, Illinois Institute of Technology in Chicago. She presented this talk before the Western Society of Engineers at its Headquarters in Chicago on September 4, 1932.

What makes a woman qualified as an engineer? Consider, first, the following important general qualifications for any engineering student:

1. An aptitude for and preparation in mathematics.
2. An ability to visualize.
3. A knowledge of mechanical movements and physical principles.
4. A preference for scientific or mechanical work.

These are some of the criteria used by recognized colleges of engineering for testing the qualifications of entering freshmen who wish to study engineering. How can a woman satisfy these requirements? High school preparation plays an important role. Proper care in the selection of the high school curriculum can increase the student's opportunities for success in her college career. The high school counselor should be consulted regarding college entrance requirements. The student who shows an interest in mathematics and science should be encouraged to gain as much experience as possible in these subjects—firm foundations for the future study of engineering. It is recommended that the full sequence in mathematics be followed in high school. With this background no woman should lack mathematics preparation. In addition, she would have gained knowledge concern-

ing her own ability to do work of a mathematical nature.

My second point, that of the ability to visualize, can, in part be developed. Courses in technical drawing and solid geometry are excellent training devices and may be included in the high school program with little difficulty. It may be noted that visualization is most useful for design work, although a lack of visualization ability need not prevent a student from entering the more theoretical fields of engineering—after all, who can visualize four, five, or an infinite number of dimensions?

A knowledge of mechanical movements and physical principles in its first analysis begins through the simple expedient of observation. Physics courses in high school will help. In shop and laboratory work in college, such fundamental information is expanded and its content enriched.

Naturally, a preference for scientific or mechanical work should be a prerequisite for anyone entering engineering. Sometimes, in our over-zealous attempts to warn women of the difficulties encountered in engineering training, we have forced them to take a defensive attitude which makes it difficult for them to drop engineering preparation after they have found themselves tempera-

(Continued on Page 10)

(Continued from Page 9)

mentally unfitted for scientific work. I have known several such cases where women have completed their undergraduate work in engineering rather than to accept the fact that their best interest lay elsewhere. The first two years of college should be used as a testing period. If the young woman likes the work, she should continue; otherwise, she should not. No stigma should attach itself to such a readjustment of goals. Though there are other possible ways to enter engineering fields, a college education is the generally accepted route. The theoretical aspects of engineering have become increasingly important—to the point that a strong background in mathematics, physics, and mechanics is perhaps more vital than the specialized knowledge of any one particular field. The specialized knowledge can be more readily obtained through industrial experience. This latter fact is well evidenced by the many companies who have their own training programs. The cooperative program of one semester in college and one semester in industry, which is now offered by many colleges, also provides an excellent opportunity for the young woman to become familiar with plant operation and application of these principles and to confirm her choice of vocation.

As for curriculum changes, I feel that any changes should be ones directed toward keeping abreast of scientific advances—changes applicable to all students. As education for any scientific or technical field changes form in response to the pressures of the changing requirements of society, engineering curricula will necessarily be adapted to these new

needs. Old values cannot be scrapped in their entirety, but gaps in current training programs become apparent. Some of these problems can best be met and dealt with at the secondary level of education. I must again stress the need for thorough mathematics instruction, sounder basic instruction in high school, in order that more advanced mathematics courses may be offered in college, permitting an earlier use of these courses in other subjects.

Aside from technical subjects, my students encounter certain problems, as well, in the presentation of written reports. Could we have more effective training in the clear and facile writing of simple technical material in the secondary schools? Today, engineering techniques have advanced beyond the "handbook" stage. A large body of literature has developed, and it is to this literature that the engineer turns today in the quest for links between austere theory and the operational level to which it must be translated. The young woman who enters engineering today should familiarize herself with the so-called "classics" in her chosen profession as well as with the standard periodical literature.

In discussing high school preparation I definitely avoided the subjects of typing and shorthand. There is no doubt that a knowledge of these two subjects prove helpful; notes taken in lectures can be more rapidly written in shorthand—and all of you who have written reports know how useful typing can be. But possession of this knowledge can have disadvantages. Every employer I have met has been looking for an engineering secretary—and some women

don't want to be secretaries! They want to be engineers! The training of engineering secretaries is a problem for the business school, not the engineering college.

As the student plans her educational career, she should not neglect the possibilities of graduate study. Since much of the undergraduate work is general, true specialization in schooling does not start until the graduate level. Many students are getting master's degrees in order to obtain more specific information in specific fields. The doctrine is becoming increasingly important for those engineers engaged in research and development work. There are innumerable scholarships, research and teaching assistantships available for those who wish to pursue graduate work. It should be noted here that most colleges require a minimum average of "B" in undergraduate work for admission to graduate school—a fact for the student to remember at all times.

Recently, the Professional Women's Council of the Western Society of Engineers began a survey of women in engineering to ascertain the fields open to women and to obtain information which would be helpful to young women considering engineering as a career. To date they have found well over a thousand women employed in almost every major field—design, production, development, sales—even teaching! Also they have discovered few schools who refuse admission to women engineering students. A survey of scholarships available to women is being made. The Professional Guidance and Education Committee of the Society of Women Engineers is also doing work along these lines. Both of these groups hope to supplement information available through the usual counseling channels.

Besides her regular classroom activities, the embryo engineer should take an active part in the student branch of the professional organization in her field. These organizations, through lectures, moving pictures, and field trips, offer an excellent opportunity to view engineering in practice. The social side of her activities should not be under emphasized. Being the only girl in a classroom of men is a wonderful tonic for the morale. Women engineers can be feminine—if you doubt my word, just take a look around you!

## JOHN BURNS CONSTRUCTION CO.

JOHN F. O'MALLEY, PRESIDENT  
Central 6-9776  
105 WEST ADAMS STREET  
CHICAGO

(Continued from Page 3)

development of sewage disposal facilities. These are the following:

- a) In general, the flatness of the built up areas. Chicago, in particular, was built on low flat ground, ten to fifteen feet lower than the present elevation. The fact that the streets were generally raised before the lots, greatly reduced the rates of rainfall runoff (in early years) and thus enabled smaller storm drains to perform adequately.
- b) The lowness of the Continental Divide on which Chicago is located. This circumstance has permitted the diversion of Lake Michigan, St. Lawrence River, and Atlantic Ocean waters to the Mississippi River and Gulf of Mexico waters, and has established the main features of sewage disposal works in the Chicago area.
- c) In general, the flashy character of Illinois rivers. In most of the Illinois streams which receive the effluents of sewage treatment works, there are prolonged periods when the flowing quantity of water is practically

zero, and high degrees of treatment are required.

To accomplish satisfactory sewage disposal, the people have provided three major municipal corporations as follows:

- d) The City of Chicago
- e) The Sanitary District of Chicago
- f) The Sanitary Districts of Illinois

The first of these designs and builds connecting sewers; the second provides intercepting sewers and sewage treatment works; and the third provides sewage treatment facilities in the smaller cities of the state.

Sewer construction in Chicago began in the spring of 1856. Some of these sewers, built of brick and from three to six feet in diameter, are still in use. It is believed that E. S. Chesbrough was the Engineer largely responsible for these early works. In a report dated February 24, 1862, he stated that the water supply of the City was seriously menaced by pollution from the Chicago River. The menace was somewhat reduced by the construction of the I and M (the Illinois and Michigan) Canal which drew water from the lake and to some extent reversed the flow of the Chicago River. The Canal was completed in July, 1871. This and associated works such as the Ogden-Wentworth Ditch, proved to be inadequate and the water supply from Lake Michigan continued to be contaminated and polluted.

Various circumstances aggravated and called public attention to the contamination and pollution and resulted in a report, dated August 27, 1885, by a Citizens Association with Lyman E. Cooley as its Engineer, which proposed a plan like that of the Sanitary District Act of 1889. Consequently in January, 1886, Mayor Carter Harrison appointed the

"Drainage and Water Supply Commission" consisting of Rudolph Hering, Benetzette Williams, and Samuel Artingstall. This Commission recommended the Main Drainage Canal and its associated works and the creation of the Sanitary District of Chicago. Lyman E. Cooley was its first Chief Engineer, the complete roster being as follows:

1890 —Lyman E. Cooley  
 1891 —Samuel G. Artingstall  
 1892 —Benetzette Williams  
 1893-1907—Isham Randolph  
 1907-1920—George M. Wisner  
 1920—Edward J. Kelly  
 1921-1922—Albert W. Dilling  
 1922-1933—Edward J. Kelly  
 1933-1935—Philip J. Harrington  
 1937 to date—William H. Trinkhaus  
 1948 to date—Wm. A. Dundas (Gen. Supt.)

In the meantime, as the City expanded, new sewers were built. At the present time the system contains 3,538 miles of street sewers. The various City Engineers and the engineers of the Board of Local Improvements have been mainly responsible for these works, including the following engineers:

#### City Engineers

1861-78—E. S. Chesbrough  
 1879-81—DeWitt Clinton Cregier  
 1882-87—Samuel S. Artingstall  
 1888-90—W. R. Northway  
 1891-92—L. H. Clarke  
 1893-94—Samuel S. Artingstall  
 1895-96—Lewis B. Jackson  
 1897-1918—John E. Ericson  
 1919-20—P. S. Combs  
 1921-22—Alex Murdock  
 1923-26—John E. Ericson  
 1927-30—Loran D. Gayton  
 1931-33—Myron B. Reynolds  
 1934-40—Loran D. Gayton  
 1941 to date—W. W. DeBerard

#### Engineers of Board of Local

Improvements  
 John E. Ericson  
 C. D. Hill  
 John E. Ericson  
 George C. D. Lenth  
 A. J. Shafmayer

Engineers and chemists who have contributed a very great deal to the pre-eminent successful sewage disposal facilities of the Chicago area are Langdon Pearce, Dr. Arthur Lederer, and Dr. F. W. Mohlman. The contribution of these men and their associates is outstanding

(Continued on Page 20)

## ABBOTT CONTRACTORS INC.

3349 South Kedzie Avenue  
 Chicago 23, Illinois

#### Ventilating and Air Conditioning

• • • • •

#### Asbestos Pipe and Boiler Insulation

• • • • •

## JAMAR-OLMEN Co.

320 N. Harding Ave.  
 Chicago 24, Ill.  
 Sacramento 2-3070

## ROBERT W. HUNT COMPANY ENGINEERS

Inspection • Tests  
Consultation

Engineering Materials

Cement • Concrete • Chemical  
Physical and Metallurgical  
Laboratories

175 W. Jackson Blvd., CHICAGO, And All Large Cities



for INSURANCE, ACCOUNTING,  
FINANCIAL, TAX AND  
ALL OTHER ADMINISTRATIVE  
PURPOSES

APPRAISAL ENGINEERING CORPORATION

3656 N. ASHLAND AVE., CHICAGO 13, ILL.  
WEllington 6-1112

"BACKED BY MORE THAN FORTY YEARS' EXPERIENCE"

## Army Engineers

(Continued from Page 8)

marily an engineering school. But it trained cadets in the art of war. It prepared them as qualified officers for all arms of the service.

Many young graduates distinguished themselves during the War of 1812. One was General Swift, its first graduate, who later became Chief of Engineers, and rebuilt the burned Capitol at Washington.

One fourth of the graduates who participated in the War of 1812 were either killed or wounded.

One of the survivors was General Sylvanus Thayer who had been graduated from the Academy in 1808.

In 1815, the Secretary of War, James Monroe, sent Thayer to Europe to study engineering practices and methods in the Military Schools abroad.

Thayer found, in Paris, the type of educational institution he had been dreaming of. It was the great French Polytechnical School which educated en-

gineers for the Nation's civil as well as military departments.

Thayer returned to America with an ambition. He wanted the Military Academy at West Point, America's only engineering school, to establish the pattern and become the inspiration for the founding of other polytechnical schools. And that would meet America's greatest need—the need for a mass army of technicians to develop the nation's resources.

The young Corps of Engineers officer's great opportunity came at age 32 when President James Monroe, in 1817, appointed him Superintendent of West Point.

Sylvanus Thayer reorganized West Point completely after the pattern of the French Polytechnical School.

The Thayer code of "Duty, Honor, Country," and the methods of teaching persist at West Point today. The same general principles dominate all technological schools which followed.

Thayer insisted that each graduate be an engineer—it mattered not what arm of the service he might adopt. Unless he be an Engineer, he was not well-rounded for leadership.

This young engineer educator had his eye on the mass army of engineers we see today. He believed that without it, our national resources never would be developed.

He believed if war came, such a mass army of civilians would cooperate with the army.

In the final analysis it is the engineer who in large measure must marshal a nation's work-power at its greatest and speediest efficiency, and place this combination at the disposal of the military command.

Three wars have justified Sylvanus Thayer's foresight. Teams of Scientists-Army-Civilian engineers have proved our greatest military asset. You see it in Korea today. You saw it in both World Wars.

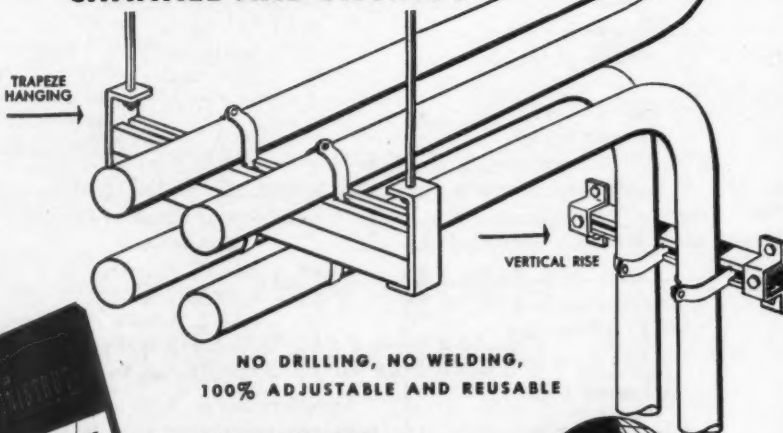
Without it our Manhattan District could never have produced the Atomic bomb.

Thayer started in 1817 with two objectives. First, create immediately better engineers to fortify the seacoasts. They would also advance the frontiers until the continent was contained. Second, create immediately better engineers for civil works. Then promote the

(Continued on Page 17)

## SUSPEND, MOUNT, FRAME AND SUPPORT ELECTRICAL CONDUIT AND CABLE

WITH **UNISTRUT**<sup>®</sup>  
CHANNEL AND FITTINGS



NO DRILLING, NO WELDING,  
100% ADJUSTABLE AND REUSABLE

Write or Phone for NEW FREE  
78 Page Construction Catalog No. 700

**UNISTRUT PRODUCTS COMPANY**

1013 W. WASHINGTON BLVD. • CHICAGO 7, ILLINOIS

PHONE: MOnroe 6-2665



The World's Most Flexible  
All-Purpose Metal Framing



Top, Dining Room  
Middle, Lounge  
Right, Large Auditorium

# Make Headquarters

## part of

## your daily

## schedule

Monday night meetings are planned specifically for the members' interest. They keep members up-to-date with the improvements and discoveries in their fields. Wednesday noon luncheons are held each Wednesday from 12:15 to 1:30 p.m. Members and guests receive an excellent meal, hear a stimulating speaker, and join in good fellowship. For reservations call RA 6-1736.

- *Relax in the lounge*
- *Meet your friends*
- *Lunch leisurely*
- *Dine with the family*
- *Use the lounge and dining room for your parties*
- *Luncheon- 11:30 a.m. - 2 p.m.*
- *Dinner- 5:30 p.m. - 8 p.m.*

# Headquarters of The Western Society of Engineers

## Crerar Library

### Notes and News

The acquisition of foreign patent specifications, to supplement the patent files in the Chicago Public Library, has been receiving active attention during the past year. Three or four additions to the collections can be announced. From The Library of Congress, the Library received a complete file of French patents from 1866 to 1952. Also from The Library of Congress, by way of the University of Wisconsin Library, have come some 2,000 specifications of recent Belgian patents; and a gift of Swedish patents has been offered by the University of Minnesota Library. Most recently we have received a large shipment of current Japanese patents from the University of California Library in Berkeley. The latter gift comes as a result of the University of California Library being a depository of publications distributed by the Japanese Diet. California is not attempting to maintain a patent collection and has offered the Japanese patent specifications to Crerar. They will continue to come in several shipments each year.

Negotiations have been initiated with France, Belgium and other countries to have specifications of current patents sent to Crerar as issued.

\* \* \*

The EXHIBIT OF THE WEEK is a new display regularly presented in the main floor lobby of the Library building. Attention will be centered in this exhibit on some of the outstanding current acquisitions and to some of the great scientific classics in the Library's collections. One of the October exhibits is devoted to the original documents on the bombing of Hiroshima and Nagasaki and the first three editions of the famous Smyth Report, "A General Account of the Development of Methods of Using Atomic Energy for Military Purposes under the Auspices of the United States Government, 1940-45." All of these documents were issued very shortly after the bombings of the two Japanese cities in August, 1945. The Library is fortunate in being able to mend this 1945 lapse in its acquisition program.

\* \* \*

A great library, like all other institu-

## Small Companies Said Most Accident Prone

Small companies have from two to five times as many accidents per employee as large companies, A. M. Baltzer, director of the small business and associations program of the National Safety Council, said September 8 at the fall meeting of the American Society of Mechanical Engineers in the Hotel Sheraton in Chicago. Asserting that safety is "good business" for the small business man, he described ways in which help could be obtained from professional societies and trade associations to carry out a safety program.

"In spite of impressive reductions made by some large companies, the overall occupational accident rate is not being reduced proportionately because small companies have approximately two and one-half times as many injuries as large companies," he pointed out.

"Established safety programs more than pay their way in reduced insurance rates, but they bring the added benefits of increased production, improved employee relations, and increased public good will. It is significant that

tions, is built by people. Crerar Library is reminded of this by the retirement on October 31 of Miss Harriet Penfield, for many years Chief Classifier on the Crerar staff. She graduated in mathematics from Oberlin College shortly after the turn of the century; and joined Crerar in March, 1911. For more than forty years she has devoted a curious and active mind to production of the Library's Classified Catalog, watching the literature of new sciences and technologies emerge and modifying the classification and subject index to accommodate them. Many thousands of technical men owe much to Miss Penfield's devotion to this vital service to research.

companies and associations with long standing, successful safety programs, have found them so worth-while that their activities tend to increase, even though the accident rate approaches the irreducible minimum.

### Small Companies Need Help

"Small companies usually require no trained professional safety engineer, but this means that other supervisors and executives must take on the responsibility for accident prevention in addition to their other duties. The mechanical engineer is in an ideal position to promote accident prevention, because his training is closest to that required by a professional safety engineer.

"Many small companies rely upon their trade association for advice and help in highly specialized fields. In like manner, these companies should rely upon professional societies, such as the ASME, for guidance.

"The mechanical engineer or machine designer is best qualified to guard the power transmission apparatus and points of machine operation. Since approximately 25 percent of all industrial accidents are due to handling materials, the mechanical engineer has an excellent opportunity to devise better and safer ways of handling material, whether by conveyor, power truck, crane or hoist.

"The increased use of welding and cutting equipment is accompanied by both fire and accident hazards. Such a simple thing as anchoring welding cylinders to prevent them from falling over is often overlooked by the welder or maintenance man. A similar example could be drawn in the setting up of new machinery, laying out new operations, and using solvents for degreasing and cutting," he said.

### National Safety Council Aids

In offering the assistance of the National Safety Council's new program to small companies, Mr. Baltzer said that it worked through trade associations, local safety councils, insurance companies, and professional societies. Many materials and services are offered, without obligation, to both members and non-members of the Council.

# Industrial Engineer's Basic Job To Save Time

The basic purpose of the industrial engineer is to save time, not only in the technical problems that are solved but in the human problems created and solved, Ralph Presgrave, vice president, J. D. Woods & Gordon Limited, Industrial Consultants of Toronto, said in Chicago on September 9. He spoke at the Western Hemisphere Management Conference held in connection with the fall meeting of the American Society of Mechanical Engineers in the Hotel Sheraton.

Mr. Presgrave deplored the all-too-popular concept of the industrial engineer as someone with whom the worker is always at odds. For instance, in the case of the man whose immediate job has disappeared because a new method was devised by the timestudy man, the timestudy man gets the blame, although a number of factors may have contributed to making this job unnecessary. "Although the popular view of industrial engineering tends to dwell on this narrow phase, nevertheless it is at this phase that industrial engineering methods are put to the test and at which it has sometimes stumbled and failed to reach its wider purpose. Failures have arisen because of the ineptitude of engineers and their employers in coordinating technical procedures with the intricacies of human relationships," he said.

The baiting of the efficiency expert is becoming anachronistic as understanding grows, he pointed out, citing as evidence the remarkable way in which our universities, once chary, have vied in establishing departments of industrial engineering; the serious approach to professionalization; and not least, the fact that trade unions, once bitterly opposed to scientific management, in many cases maintain industrial engineering staffs of their own and operate schools for time study stewards and others.

"At least there is an implied admission of the principle involved and the fact that they use their knowledge to criticize management techniques may

well lead to improvement in those techniques," he pointed out.

"In applying the scientific approach to business and industry, industrial engineering proves to be more than a conglomeration of techniques but is essentially a point of view or a philosophy which bears directly on the age-old problems of health, poverty, feudalism, illiteracy, and personal freedom.

"The industrial engineer is committed to the improvement of the economic status of the nation by following the simple rule that the less time it takes to make it, the more people can have it. In this general respect, he is no different from the inventor of gadgets, the physician who prolongs useful life, or the geneticist who develops a new hybrid. But when we consider his more specific functions, other more pointed and less sweeping human aspects develop. Some of these conflict with others and observers have professed to see an inconsistency in that the industrial engineer may take away with one hand and give back with the other.

"It is a fact that the time-gains and higher productivity from motion study, timestudy and incentives do permit shorter work weeks and do help provide pensions and medical services. But I doubt if many engineers regard these as charities to be paid for by stringencies elsewhere. More likely they will regard them as all part of the same piece and designed to promote long-term efficiency.

"They do however point up another human aspect. Consonant with the operation of industrial engineering, it is becoming more and more the thing to regard with concern and without ulterior motives, the health and welfare of employees. In recognition of this, governments, employers and trade unions, all in greater or lesser degree, tend to employ various procedures designed to distribute money more evenly in order to alleviate distress. Opinions to the contrary, the individual is looked after better than ever before and, reverting to

'human relations,' is the object of more concern than ever before.

"This is not the birth of a new humanitarianism. The impulse always existed," but, he emphasized, "In order to fulfill one's charitable instincts, one must have the means—the money and the time. The principle that directs the industrial engineer has provided the money and the time."

In spite of employee opposition to the changes made by the industrial engineer, "people are more and more being directed to work for which their aptitudes and temperament are suited. They are more effectively and rapidly trained, they are more intelligently promoted, working conditions become increasingly more pleasant, all of which means higher earnings sooner plus obvious psychological satisfaction. A further by-product is the short week, the extension of leisure and the opportunities it provides," Mr. Presgrave said, adding that these things demonstrate a growing understanding of the basic human aspect of industrial engineering, that the gains must be secured for the benefit of all while means are found to temper the results to the individual.

**For a good meal any  
day or every day of the week,  
Monday through Friday, eat  
at your WSE dining room.**

**There you may dine at your  
leisure with your family or  
friends. And there you will  
enjoy the excellently prepared  
food of WSE's new chef about  
whom we receive compliments  
almost daily.**

**The dining room is open  
11:30-2:00 and 5:30-8:00,  
Monday through Friday. For  
reservations, call RA 6-1736  
today!**

## Dr. Gilbreth

(Continued from Page 6)

culiar responsibility of the scientist, and we work in that field.

On the other hand, it became evident in all the speeches that we've had today that putting the human element first and having an understanding of human beings is a vital necessity. There is some confusion in some people's minds as to the difference between personnel work and human relations, and a feeling that those of us who do not do personnel work in some way are remiss or do not know much about personnel procedures, or lack emphasis on human relations. But personnel work can be just as technical as operating work, and satisfying human relations imply a warm understanding. A friendly human being is back of them. So, as we go on insisting, as we do, on technical adequacy and training, on general background and education, and on understanding the various ways of communicating with people, the thing we must remember above all is this: it is the person back of all of these, or within all these, or part of all these, that counts. You and I know right well that very often the most technical courses we have taken have been taught us by people who were such fine examples of warm friendly human relations, with a love of the subject and a love of the student, and a willingness to give and take, that there was that kind of fusion which we long to see in the training and in the life of every engineer.

We have talked continuously in these two days about using every resource.

The moment that you concede that you must have technical adequacy, fine human relations and warm friendly personalities, it becomes evident that you must tap the resources in many fields. One of the difficulties is that we have almost over specialized. Even in our own field we are apt not to know everything which is going on in every other field in our profession. The Engineering Institute of Canada has memberships from all types of engineers and schools of engineering, and the same thing is true in our women's society. Thus, we do have a chance to find out more about the other branches and the resources that are there. And of course, the same thing is true in such a field as psychology. There are industrial psychologists, educational psychologists, clinical psychologists, and many other kinds of psychologists. Some of them know a great deal about their own fields in psychology and not very much about others. As we draw upon these resources and as we in turn are resources, we do want more and more to try to draw into our teams people of all branches of these affiliations. We want to broaden our own contacts and our own knowledge within our own organizations, and within the engineering group in which we belong all over the world. While we may not know in detail what the resources are, we do know where the resources are.

We all feel very sure, as we face the future into which we are going, that we've got to walk over some of the imaginary lines which separated disciplines, and that we've all got to go into that picture together. If you're going to work with the human element,

certainly your physiologists, your people who are working in bio-mechanics, your people who are in the field of psychology and psychiatry and of all the other fields which have to do with human beings, your economists, your sociologists, your social psychologists, must all be consulted. The lists of the names would be as many as the lists of all the meetings and places in the fine book which describes our Congress. But all of us have to know at least enough about each other's work so that when we do gather around tables, and pool our resources, we are able to bring into the picture everyone who has something to contribute. More and more it becomes evident in our findings as we face the future that it's going to be a matter of "teaming up" if we are going to succeed. We can trace this all the way through, if we want to, from international affairs down to national affairs, to affairs in our states, in our communities, in our small clannish neighborhood groups, and in our homes.

I wish there were time to talk about our homes, and the wonderful teamwork our young GI's have developed. You have there an unassailable team because you have aims which are common. You have the complete pooling of resources with no sex discrimination. Anybody does anything which needs to be done, with no idiotic ideas that any kind of work is not worth doing well; happily, it is done to further the common aim.

No one can pretend that this is going to be a simple, easy, uncomplicated future which faces us. Those who are trying to state the problem often become appalled because of its difficulty and its complexity. But at least we know we have a method of solution, and that goes a long way. It seems to me that as we separate and go back to our jobs, we have gathered much which we can take with us. It may be a hard future, perhaps it will be. But if we go into the future with a common aim, which I think we have, with real teamwork, and with a serenity of spirit, which destroys tension and makes for unity, surely we shall go in unafraid. Let us go into this future together.

## More than 15,000 BOILER PLANTS

of all types and sizes will testify to the

**OUTSTANDING PERFORMANCE  
OF "DIAMOND" PRODUCTS**

**DIAMOND POWER SPECIALTY CORPORATION**

**LANCASTER, OHIO**

Soot Blowers • Water Gauges and Columns • "Utiliscope" (Industrial Television)

## Army Engineers

(Continued from Page 12)

founding of other engineer schools, based upon standards of Character, Leadership, and Knowledge.

Military engineers played a notable part in carrying out these objectives.

They led the way in exploring the continent. They were the pathfinders sent out by the determined government at Washington. They guided, surveyed, mapped, and fought Indians and Nature across the continent. They broke trail for the sweep of emigrants westward.

They made surveys for work on the Chesapeake and Ohio Canal. They extended the National Road from Cumberland to the Ohio—and beyond.

They made the Ohio, Missouri, Mississippi safe for navigation. They opened up harbors for steamships on the Great Lakes. They built and maintained light-houses necessary for safe navigation. These were located in coastal harbors, on the lakes, and on the rivers.

Army engineers sent their exploring and surveying parties across the Great Plains. They crossed the Rockies. They went down the Columbia River to its mouth on the Pacific.

Long, Fremont, Bonneville and a host of others were engineer pathfinders.

A roll call of the engineer officers in the Mexican War is impressive. It reads like a roster of famous Union and Confederate Generals. Totten (Chief Engineer), Lee, McClellan, Johnston, Meade, Beauregard, Pope, Halleck, Fremont. To these add Grant, Jackson, and Sherman, of the other arms. For they, too, were qualified engineers, as products of Thayer's system of education at the Military Academy.

With victory in the Mexican War, the continent was at last contained.

Officers of the Corps of Engineers surveyed the new southern boundary line. It now ran west to the Pacific. The last segment of the Great Western Empire was soon annexed.

These things were all accomplished by application of America's greatest power. That is the power of Engineering Character, Engineering Leadership, Engineering Knowledge.

With the continent contained came the accomplishment of the second objective.

That was founding more technological schools.

The Army Engineers also spearheaded that pioneering movement. It resulted in greater power of Engineering Knowledge.

Graduates of our first engineer school were available. Gifted educators among them promoted our earliest Technological Schools. Their listing is impressive. Among them the list includes:

The Lawrence Scientific School  
The Sheffield Scientific School  
University of Michigan Engineering Department  
Brooklyn Polytechnic Institute  
Virginia Military Institute  
United States Naval Academy  
Columbia School of Mines  
Thayer School of Civil Engineering at Dartmouth  
Georgia School of Technology

By 1860 there were ten technical colleges in existence—including West Point and the Naval Academy (founded in 1845). All but one (Rensselaer Polytechnic Institute) had West Point graduates on their staffs.

By this time, both the objectives of 1817 were in full swing. Engineering vision and genius had generated the power to accomplish. Engineering Character, Engineering Leadership, and Engineering Knowledge had been employed to fulfill our destiny.

I am not a graduate of West Point. But I am a graduate of one of the Technical Schools which resulted from Thayer's efforts. Practically all of us assembled here today are graduates of such schools.

It is appropriate, I believe, that in observing this engineering centennial, we give recognition to the 150th anniversary

of America's first engineering school.

For West Point graduates were charter members of the American Society of Civil Engineers.

But let us return to the National Stage of 1852.

Franklin Pierce was duly elected President in November, 1852. He made his southern friend, Jefferson Davis, his Secretary of War.

Davis' appointment soon created a big job for Army Engineers. The President, Jefferson Davis, and Stephen A. Douglas were all expansionists. They all agreed the best way to expand was by rail. So they conceived the plan for a series of transcontinental railroads. These would tie the Atlantic to the Pacific.

The Corps of Engineers already had played a part in railroad building. There was hardly a railroad, by 1855, that had not used its services. An early policy of the government was to lend officers of the Corps of Engineers to business concerns interested in developing the country.

The Army Engineers now spearheaded the new railroad projects. These new routes were the first four transcontinental railroad systems. There were both Army Engineers and Civilian Engineers in those surveying parties.

The Building of those roads, and the development of the continent they would serve, was to be the epic of American achievements.

This first demonstration of teamwork between Army Engineers and Civilian Engineers proved Thayer's theory. And it set an example which had been followed ever since. American Engineers—

(Continued on Page 18)

## GILBERT-HODGMAN, INC.

Electrical Engineers and Contractors

327 SOUTH LASALLE STREET

CHICAGO 4, ILLINOIS

Members W.S.E.—A.I.E.E.

HARRISON 7-8774

(Continued from Page 17)

Military and Civil—have cooperated all ways in peace and war.

But this peace-time beginning was soon interrupted by the tragedy of war.

When the war occurred between the states there were ninety-three Engineer officers.

Fifteen resigned and joined the Confederate Army. Seventy-seven remained in Union Service. One took no part in the war.

Fifty-five of these seventy-three Engineer Officers became general officers during the war. Fifteen died or were killed. Two received Congressional Medals of Honor. A good military record for lowly diggers of ditches.

Did glamor of war wean these general officers from peacetime engineering work? It did not.

Those who joined the Confederacy later served their respective states as civilian engineers. Most of the others remained in the United States Army, the bulk of them in the Corps of Engineers.

And now that peace was upon the land they had their great opportunity in the new peacetime work of the Corps.

In 1865 thousands of war veterans pounded their swords into plowshares.

And the great west needed plowshares. Under a benign government homesteads were plentiful in the sparsely populated west.

The movement west after the war primarily was a quest for land. A man wanted a plot of soil he could call his own. Never was there a period of such agricultural development.

The new Chief of Engineers after 1865 was Major General Andrew A. Humphreys. He had been one of Sylvanus Thayer's brilliant students at West Point and had distinguished himself during the Civil War as a Corps Commander in the Union Army. He was famous also for his exhaustive report on the Mississippi River.

Humphreys was a happy choice for Chief of Engineers. And he had a remarkable group of veterans on his staff. All had had civil works experience before the war and the nation was fortunate in having them now to spearhead internal improvements.

Two thousand years ago, Pliny, the Roman naturalist, in speaking of water, said: "This one element seemeth to rule and command all the rest."

After the American Civil War, until World War I, Army Engineers were mainly occupied with peacetime work. They were managing America's enormous resources of water, under a program of rivers and harbors improvement.

There are approximately 200 basins of streams in the United States. The great Mississippi-Missouri is the longest river system in the world. It drains forty per cent of our land area.

The system is 4500 miles in length. Its basin contains approximately a million and a quarter square miles.

In addition, are other great river basins.

You can visualize the job the post-Civil War Engineers had.

The earliest civil works of the Corps had concerned navigation.

As the nation expanded, Congress assigned it other phases of water management.

The new communities, industries, and farms had to be protected from floods.

Our harbors, none of which in natural state could accommodate modern draft shipping, had to be dredged and improved.

It is an undisputed fact that the great program of internal improvements, spearheaded by that talented group of Engineer officers from 1865 to 1895, had much to do with cementing the National Defense of 1917.

For that internal improvement work helped make possible the phenomenal development of engineering and scientific knowledge after the Civil War.

The period from 1865 to 1895 was marked by feverish development in all lines. All inventive minds were active every minute. Something invented today was sure to be replaced by something invented tomorrow.

Engineers began to apply science to practice. That brought us our modern high-speed engine. That ushered in the age of electricity. It gave us hydro-electric power.

It gave us the steam turbine, now producing fantastical power.

It would take hours to name the developments of those feverish days. Much less discuss them.

They were the inventions important to modern engineering. They were the inventions for the production of power. That is the element most in demand by the engineer.

The military engineer has been abreast of this march for power.

Immediately after 1865 General Humphreys established the Engineer School at Willets Point, New York.

A laboratory for scientific experimenting was set up. The school was a Graduate school of application for young Engineer officers.

In 1901, it was moved to new quarters at Washington Barracks, District of Columbia. After World War I it moved to its present location at Fort Belvoir, Virginia.

Today, Army Engineers' research continues on the largest scale in its history. At Fort Belvoir, modern engineering equipment is designed and tested. It includes earthmoving and heavy construction equipment. It includes all major items in military construction.

The other side of the picture is water management. Again we find a great research department. This is maintained at Vicksburg, Mississippi. It is the Waterways Experiment Station of the Corps

**THE  
MONADNOCK**  
53 West Jackson Blvd.

**LONG RECOGNIZED AS**

*Headquarters  
for Office Space*

**FOR  
Engineers  
Architects  
Patent Attorneys  
Manufacturers'  
Representatives**



*The Whole Loop at its Doorstep*

of Engineers. Research and study of hydrology is its objective. Flood control, navigation, and related problems are stressed.

Many peacetime operations require that Army Engineers take the lead in development of new construction methods. The experiment station at Vicksburg is advancing technical knowledge in the fields of concrete, hydraulics, and soils mechanics, valuable to our peacetime economy, invaluable to wartime operations. It was at this station during World War II that design criteria was developed that made possible the rapid construction of overseas bases. It was at this station that operations for landings at enemy-held ports were planned.

Twenty-eight years before the events commemorated by this centennial, the United States, through the Congress, entrusted the development of the nation's harbors and the nation's waterways to the care of the Corps of Engineers and provided from year to year the funds therefor. In more than a century and a quarter—from 1824 up to and including June 30 next—the total amount of money appropriated by the Congress for all civil works expenditures by the Army Engineers is less than the single item presented in this year's fiscal budget for the Mutual Security Program abroad for the fiscal year 1953 alone.

I call attention to that, not in any sense critical of the program of Mutual Aid—I believe in it—but rather to point out by comparison how little we have done for ourselves over a century and a quarter.

That amount invested by the Government through the Corps of Engineers has bought for the United States a system of the best harbors in the world—286 of them—not one of which in its natural state could have handled modern draught vessels. Those harbors were the spring-boards to launch the men and materials from which our overseas victories were forged in two crucial world wars.

The expenditures I mentioned also bought for this nation nearly 28,000 miles of improved inland waterways which today are carrying millions of tons of commerce, and which in war were able to take on the tremendous amount of bulk freight which the other badly overburdened systems of transportation could not have carried. As you

know, those inland waterways permitted us to establish additional shipyards far inland to build seagoing war-craft and float those craft to the ocean.

The expenditures I have mentioned previously have brought flood control projects which are preventing damages estimated at more than \$300,000,000 annually, although flood control work as a Federal responsibility is only in comparative infancy.

National progress—national defense—national well-being, these are all built-in features of the investments in our waterways. Again let me say, in view of the return, it is not how much has been invested—the amazing thing is how little.

From such study and work Army Engineers have learned the magnitude of the nation's water resources and their importance.

Our engineers have learned that basins of all streams must be controlled—and how to control them. We have become the greatest industrial nation in the world. Our great industries, with immense populations, are primarily located in water basins. To subject them to uncontrolled floods is to commit national suicide.

Without increased control of water we lose the cornerstone of our Defense. For we lose the cornerstone of our industrial strength.

When war comes our armies are dependent upon our industries. And our industries depend upon water power. They depend upon increased agriculture in the river basins. They depend upon cheap transportation for raw materials and finished products.

If this nation does not protect and control its water resources it will dry up and rot on the vine, as so many other rich civilizations, centuries before it, have done.

I have lived with this subject for years. And during the past four years it has been my personal responsibility, in a large measure to direct the work of managing our Natural Water Resources.

That is why I said at the outset of this talk that engineers and the public should work more closely together. Because this is a public problem. I have seen the terrible consequences of failures to control water. And I have seen the wonderful possibilities of success also.

This country of ours for hundreds of

years to come will continue a stirring challenge to the engineering professions—military and civilian—I have every confidence that the challenge will be met in the future with the same high purpose that has marked the past.

They were stalwart members of the profession back in 1852. They faced up to the problems of their time with courage and perseverance—and a great nation arose on the foundation of their engineering achievements.

The problems and the challenges that confront the nation and the engineering profession in 1952 are no less demanding—the call to serve, to persevere and to pioneer are even greater now than then. May our future efforts and our achievements be worthy of the tradition that comes down to us from that little band of determined engineers of a century ago. I believe that, with all of our talent and the means available to us today, if we are willing to work, we will be able in 2052 to look back on this day as the beginning of new era. If we do work and make the most of our means, the high standard of living, which we enjoy today, can be maintained and improved.

## READY COAL &

CONSTRUCTION COMPANY

- HEAVY CONCRETE CONSTRUCTION
- RAILROAD FACILITIES
- BRIDGES
- PAVING
- GRADING
- SEWERS

BOULEVARD 8-4311  
4911 SO. SHIELDS AVE.  
CHICAGO 9, ILLINOIS

## **WM. E. SCHWEITZER & CO.**

### **General Contractors**

2207 DODGE AVENUE  
EVANSTON, ILLINOIS  
AMbassador 2-3489 GReeleaf 5-4614

★ ★ ★

### **Contractors for Industrial Construction**

## **E. R. GRITSCHKE**

and

### **ASSOCIATES**

Consulting Engineers

Designers of

**MECHANICAL and ELECTRICAL SYSTEMS  
for BUILDINGS**

**11 S. LaSalle St., Chicago 3, Ill.**

## **J. W. DURKIN**

District Manager

### **Sangamo Electric Co.**

Room 1942  
Field Bldg.

Phone:  
ST 2-0438-9

135 South LaSalle Street  
CHICAGO 3, ILLINOIS

## **SARGENT & LUNDY**

**ENGINEERS**

140 S. DEARBORN STREET

CHICAGO, ILLINOIS

## **Batley & Childs**

**ENGINEERS — ARCHITECTS**

231 So. LaSalle Street  
Chicago 4, Ill.

INDUSTRIAL PLANTS  
POWER PLANTS  
RAILROAD SHOPS & TERMINALS

**DESIGN**

**SUPERVISION**

## **Sewage Disposal**

*(Continued from Page 11)*

in the annals of Sanitary Engineering.

Mr. Pearse came to the Sanitary District of Chicago in 1909 as Sanitary Engineer to accomplish a system of great sewage treatment works then envisioned by George M. Wisner. He started with the design, construction, and operation of the 39th Street sewage testing station which was followed by the Stock Yards testing station and others with Dr. Lederer and then Dr. Mohlman in charge of the laboratory work. With Mr. Wisner, he made the general plan of the sewage treatment system of the Chicago area comprising the great Calumet, Southwest, and North side plants. During the past forty-three years he had made notable contributions to Sanitary Engineering and to sewage disposal, not only in the Chicago area, but in many other communities. In association with this great work, Dr. Mohlman has become one of the leaders, throughout the world, in sewage disposal contributions to community welfare.

The engineers, superintendents, and chemists of the two dozen or more Sanitary Districts in Illinois have made many notable contributions to the technical literature and the works under their direction are models of effective results and of low cost. Among these, the following are favorably known in this country and abroad.

William D. Hatfield, Decatur  
Walter E. Sperry, Aurora  
John R. Longley, Peoria  
L. S. Kraus, Peoria  
C. C. Larson, Springfield

One of the most interesting and best operated sewage treatment works in the Chicago area is that of the Gary, Indiana Sanitary District of which W. W. Matthews is Chief Engineer. The recent demonstration, under Mr. Matthews' direction, of the handling of steel mill wastes in an activated sludge plant, is typical of the high quality of the contributions in this field.

Can the contributions of these engineers to the community in the field of sewage disposal be summarized briefly within the limits of a panel program? In my opinion, the answer is NO because they reach so far into the welfare of individual people. It is worth-while, however, to illustrate the subject by describ-

ing some of the more important contributions.

The contribution of engineers who design sewers, is relatively unspectacular. It is, however, a great matter to the millions who make up urban populations. Thus, the studies and reports on rainfall and runoff by Hill, Lenth, and others contributed to the improvement of the design of those structures. To an important, although less direct extent, this part of sewage disposal enlarged the contributions which derive from sewage treatment and made them more "personal" in their improvement of the public welfare.

The contributions of engineers who design sewage treatment works are indeed spectacular. To illustrate, the following are listed:

- 1) Practically eliminating typhoid fever.
- 2) Maintaining a clean lake water for bathing and recreation.
- 3) Cleaning Illinois rivers and bringing back aquatic life (in many cases).
- 4) Making available the results of the operation of testing stations on sewage treatment and especially industrial wastes problems.
- 5) Determining the validity of many sewage treatment processes and conversely, showing the worthlessness of others.
- 6) Developing such high standards of design and of contract plans and specifications, as to improve the work of other engineers.
- 7) Demonstrating, by the operation of large scale works, safe loads and many useful devices for operation.
- 8) Developing into successful practice, original methods of drying and incinerating sludge.
- 9) Preparing and publishing such outstanding annual reports of sewage disposal operation as those of the Sanitary District of Chicago.

Contributions of this kind have, of course, been made by great numbers of engineers in the United States and abroad. It is my opinion, however, that nowhere else can the results of such contributions be better observed than here in the Chicago area and in Illinois.

## Resolution of Appreciation Issued

The Engineers' Council for Professional Development, at its Twentieth Annual Meeting, held in Chicago, September 5 and 6, 1952, in connection with the Centennial of Engineering, is grateful for the circumstances which have made it possible to arrange a joint program with one of its consultant societies, The American Society for Engineering Education, and thereby to share with it public discussions of contemporary demands on engineering curricula, and to enjoy the stimulation of the company of its members at a joint luncheon and a joint dinner.

The Council is particularly grateful to Arthur B. Bronwell, secretary of The American Society for Engineering Education and to J. Earl Harrington, secretary of the Western Society of Engineers and his committee, for the manner in which they planned for our convenience and enjoyment.

To the Western Society of Engineers for their hospitality in offering the use of their quarters and the services of their staff for the session and luncheon on Saturday.

To the speakers who addressed the Council at its luncheons and dinner:

John Millett, director, Commission on Financing Higher Education, Columbia University, for his luncheon address on "The Financing of Higher Education in America;"

John F. Gordon, vice president, General Motors Corporation, for his dinner address, "Orientation and Development of Junior Engineers;"

E. G. Bailey, chairman of the board, Bailey Meter Company, for the stimulating and positive answer given to the question, "Can Engineering Graduates Man a Company?"

To Mrs. William R. Marston, and her committee, for the splendid manner in which they organized and conducted arrangements for the entertainment of the ladies.

At the close of the three years of dedicated services by its retiring chairman,

the Council wishes to record its thanks and appreciation to Harry S. Rogers, for directing attention in clear language to the philosophy which animates ECPD; for defining the relationship of ECPD to other joint bodies and the engineering societies; for examining the objectives and programs of the standing committees and stimulating their further progress; and especially for his success in shifting many of these programs from the "talk about" into the action stage.

And, finally, the Council wishes to express its thanks and appreciation to Miss Elsie Murray, its administrative secretary, for her loyal and intelligent service.

Committee on Resolutions  
Donald S. Bridgman  
George A. Stetson

## I.I.T. Trustees Are Elected

Herbert P. Sedwick, executive vice president of the Public Service Company of Northern Illinois, was elected October 19 to the board of trustees of Illinois Institute of Technology. He will serve a three-year term on the board.

Sedwick became executive vice president of the Public Service Company of Northern Illinois last year after serving as vice president since 1941. He is a director of the Commonwealth Edison Co., the Western Society of Engineers (of which he is past president), and the Medical Center Steam Co., of Chicago.

James D. Cunningham, president, Republic Flow Meters Co., was reelected chairman of the board for the year 1952-53; and Dr. John T. Rettaliata, president of Illinois Tech, was reelected president. Another officer reelected was Alex D. Bailey, vice president, Commonwealth Edison Co., vice chairman.

Cunningham will also be chairman of the 1952-53 executive committee of Armour Research Foundation of Illinois Tech, and Dr. Rettaliata will be president.

*For the finest in drinks  
and the*

### Blackest in Magic

visit your lounge bar. Yes, Frank Everhart, the combination bartender-magician still holds forth there, waiting to serve you. Come in and see him!

4606-28 West 12th Place  
Chicago 50, Ill.



Bl shop 2-1533-4-5 Town Hall 3-0905

### Chicago's Largest Office Building

A key location of convenience and prestige—that is the Insurance Exchange Building. A limited amount of space is currently available, and we will be glad to tell you what we have, if you will write to

### INSURANCE EXCHANGE BUILDING

**L. J. SHERIDAN  
& CO.**

Management Agent

175 West Jackson Boulevard  
Chicago 4

Telephone WAbash 2-0756

# Reviews of Technical Books

Available at WSE Headquarters

## Airfoil Theory

*Basic Wing and Airfoil Theory*, by Alan Pope, McGraw-Hill Book Company, Inc., New York, N.Y. 1951. 294 pages. \$5.00.

This is the first book published on aerodynamic theory written for the college senior or first year graduate. Many statements which have had to be assumed during elementary courses in practical aerodynamics are clarified in this book. The mathematics used is not beyond that which is used in undergraduate engineering courses. This very up-to-date book includes problems as well as examples, and no step needed for a clear understanding is omitted.

Following every theory given in the book is a statement of its limitations as well as a definition of its applicability to present practices. Recent theories on airfoils and wing designs are given, and a demonstration of the thin airfoil theory is extended to cover thick airfoil theory. The effects of wing and airfoil thickness, and the determination of pressure distribution over airfoils, are discussed.

*Basic Wing and Airfoil Theory* is written clearly, and is well organized.

## Radio Operator's Manual

*Radio Operator's License Q & A Manual*, by Milton Kaufman, John F. Rider Publisher, Inc. New York 16, N. Y. First Edition, 1949. 608 pages. \$6.00.

Via the question and answer method, this book gives expert coverage of A.M., C.W., and F.M. Radio; Television; Marine Radar; and Loran, based on radio license examination questions in the "Study Guide" and other F. C. C. releases. The Qs and As are grouped according to subject matter and each is identified by number for ready reference. Often the answer is amplified by a discussion of the subject including examples. The whole is liberally illustrated and cross-indexed. An entire section is devoted to F. C. C. amateur radio license requirements and rules governing amateur radio service.

It should prove invaluable to the radio operator cramming for his license exam. and a handy reference to students and radio hams.

H.P.H., W.S.E.

## Soil Mechanics

*Soil Mechanics, Foundations, and Earth Structures*, by Gregory P. Tschebotarioff, McGraw-Hill Book Company, Inc., New York, N.Y. 1951. 655 pages. \$6.50.

This introductory but far from elementary book presents the theory of soil mechanics, integrated with the practice of foundation and earth structure design and construction, and shows the interrelations of these subjects. Soil mechanics theories are developed from basic principles. Examples derived from actual practice are used to illustrate how these

theories are applied. The limitations of these theories are also given.

Professor Tschebotarioff devotes nearly a fifth of the book to lateral earth pressures and to design problems which are related to the subject. He emphasizes experimental data and field observations. As illustrations, he gives examples of both successful and unsuccessful structures, and he compares laboratory forecasts with results obtained in the field.

The book has over 400 illustrations and references. Also included to aid in study are many step-by-step solutions. H.K.E.

## Heat Transfer

*Industrial Heat Transfer*, by F. W. Hutchinson, The Industrial Press, New York, N. Y. First Edition, 1952. 326 pages. \$6.00.

This is a valuable textbook for students of heat transfer and a useful working handbook for practicing engineers who must make accurate calculations of heat transfer coefficients and rates in designing or specifying actual installations.

It presents and discusses equations having the widest industrial application, analyzes their applicability, and provides graphs to permit direct visual solutions. These graphs permit the users to take from them, in a matter of minutes, information that was built into them over a period of hours. This procedure also tends to eliminate possibilities of errors in calculations.

This book concludes with an appendix and an excellent index.

H.P.H., W.S.E.

## Fluid Flow

*Fluid Flow in Pipes*, by Clifford H. McClain, The Industrial Press, 148 Lafayette Street, New York, N.Y. 1952. 123 pages. \$3.00.

This book clarifies the handling of problems involving the flow of liquids and gases through ducts and pipes. It uses simple language and explains the fundamental processes involved. Also, it shows in detail how the formulas are derived and used. A knowledge of elementary algebra allows a person to follow the practical working methods and formulas. The advanced student will find the principles involved clearly and completely developed.

This book emphasizes the theory and practice of fluid flow from a dimensional standpoint. It clarifies the importance of the maintenance of consistent expression of dimensional relationships in solving problems.

*Fluid Flow in Pipes* demonstrates how to handle such factors as viscosity, friction, turbulence and head, and illustrates the general influence of each. The book pays especial attention to the theory, measurement and dimensions of

viscosity, and the units of evaluation are explained with care.

Comprehensively discussed are the conditions of turbulence and streamline flow as they affect problems in friction and energy balance. Emphasized are such factors as the Reynolds number. Empirical formulas used in calculations of flow are given with a discussion on the physical basis of such formulas. The applications of principles to problems in piping are presented throughout the book, accompanied by worked-out examples.

H.K.E.

## Electrical Phenomena

*Electrical Phenomena at Interfaces*, edited by J. A. V. Butler, Macmillan Co., New York, N. Y. 1952. 309 pages. \$6.75.

This book by Butler and cooperating experts covers the basic researches on electrical phenomena at interface with a full amount of their applications in colloid science, electrochemistry, biochemistry, and physiology. It will be helpful to many to find in one volume both the physical chemistry and the biological and other applications. Physicists and physical chemists will have brought to their notice, perhaps more directly than might otherwise be the case, the more complicated systems which occur in nature toward the elucidation of which their work is progressing.

Numerous references assist the interested student to find advanced work on related subjects.

H.P.H., W.S.E.

# RONNINGEN

**FILTERS  
AND  
STRAINERS**

**QUICK COUPLING  
NON SHORT CIRCUITING**

**For Water, Brine, Chemicals, Petroleum Products, etc.**

**PARTICLES LARGE OR SMALL WE FILTER THEM ALL**

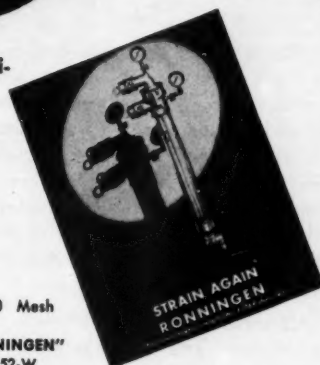
**Capacities: 5-5000 G.P.M.**

**Sizes: 60-100-200 Mesh  
MONEL METAL, in stock**

**Pressures: To 150 P.S.I.**

**Also Fine Filtration to 700 Mesh  
(30 Microns)**

**"STRAIN AGAIN WITH RONNINGEN"  
Write for Catalog No. 1152-W**



**RONNINGEN MAUFACTURING CO.**

**Quick Coupling FLUID FILTERS Non Short Circuiting**

**122 South Michigan Ave., Chicago 3, Illinois**

**Phone: HArrison 7-0388**

## SO THAT THE SOCIETY MAY SERVE YOU BETTER

**Be sure to keep it informed  
of any changes in your status**

### Do We Have:

**Your Position?**

**Your Firm Name?**

**Your Firm Address?**

**Your Home Address?**

**Your Phone Numbers?**

To make sure we have you listed correctly,

**MAIL THIS FORM TO THE WESTERN SOCIETY OF ENGINEERS  
84 E. Randolph St., Chicago 1, Ill.**

Name: .....

Position: .....

Firm: .....

Firm Address: .....

Home Address: .....

Home Phone: ..... Business Phone: .....

# Ellet Award Competition Is Announced

The Junior Division of the Western Society of Engineers announces the opening of the Charles Ellet Award competition for 1953.

This award was established in 1929 by a gift from E. C. Schuman, a Junior member, and is symbolized by a beautiful loving cup on which is engraved the names of the recipients and the names of their respective schools. The cup is on display at the WSE headquarters. As evidence of the honor bestowed, the winner receives an engraved certificate and a prize of \$25 in cash.

All members under 30 years of age are eligible. The award is made to the member who, in the opinion of the committee of awards, is adjudged to have excelled in the preparation and presentation of a technical paper presented in competition for this award at a meeting of the Junior Division.

Past recipients of this honor have been:

John D. Burlie,  
Purdue University.  
Francis E. Wolosewick,  
Armour '27.  
Joseph Kucho.  
Irving J. Kadic,  
Chicago Tech. '27.  
Grover C. Lewis,  
Illinois 30.  
Robert W. Suman  
Armour '35.  
George A. Nelson,  
Armour '35.  
Raymond V. McGrath,  
University of Washington '35.  
Ray F. Erickson,  
Donald Klusman,  
Washington U. '48.

All younger members of the society are urgently recommended to consider entering this competition. It offers an excellent opportunity for the younger engineer to obtain recognition for his endeavors as well as an ideal opportunity for him to acquaint himself with the various aspects of paper preparation and

presentation. Such experience could be invaluable to him in his future professional career.

Formal entrance into the competition may be made by writing the Society headquarters, stating your intention and the subject of your paper.

Further information may be obtained by contacting Society headquarters or Don Klusman, at Official 3-9300, Ext. 4834.

## To Take Poll of Engineers on Literature Use "Know-How"

### LITERATURE-USE "KNOW-HOW" ..

The Engineering Library, the engineering literature center, is one of the most expensive laboratory units maintained by any organization, industrial or educational. Its cost is not justified if it is not consistently used to support current operations and validate anticipated interests of an organization.

Assuming that many engineers do not extract full value from engineering literature, the *Engineering Literature Project* of the *American Society of Engineering*

*Education* is trying to find out why this is true and what can be done about it. What does the practicing engineer think of the value of literature-use, literature searching? Does he think it isn't necessary, or on the other hand, that it's pretty important for an engineer to know his way around in a library?

Briefly, the *Project* wants to know the opinions of practicing engineers on the following points:

- What value they place on library or literature "know-how."
- What training they have had in this direction.
- Whether they think such training is desirable or even essential for prospective engineers.
- What ideas they have on the sort of training, if any, which should be given.

A questionnaire, which can be completed by simply using checkmarks in answer to the above questions, is being sent 1000 engineers whose names have been selected at random from society and association directories. Mailing of the questionnaires is scheduled for Monday, November 24, 1952.

Results of this survey will be of great assistance either in developing for future engineers a form of instruction emphasizing the engineer's outlook on the use and need of literature and of library "know-how;" or in forgetting the whole thing. A copy of the questionnaire is available upon request by addressing: Engineering Literature Project, ASEE, c/o E. A. Chapman, Rensselaer Polytechnic Institute, Troy, New York.

## W. H. LYMAN CONSTRUCTION CO.

### General Contractors

134 N. LA SALLE • CHICAGO • STATE 2-8154

## WSE Personals

**John R. Turner** ('20, LM), has retired from Illinois Bell Telephone Co., as of October 31.

**James W. Barnett** ('49, A), is now Chief Engineer, E-Z-On Corp., Chicago.

**Robert J. Durkin** ('49, A), is Application Engineer with G. & W. Specialties Co., Chicago.

**Minor H. Fink** ('45, M), is now Division Personnel Supervisor at 208 W. Washington, for the Illinois Bell Telephone Co.

**Charles F. Lukes** ('49, A), is Civil Engineer, American-Marietta Co., Chicago.

**Dwight E. Perriene** ('52, M), of the Chicago and Western Indiana Railroad Co., is now Assistant Chief Engineer at Dearborn Station, Chicago.

**L. H. Reichard** ('24, M), is now Superintendent, Shops, Chicago Transit Authority, Skokie.

**Frank P. Kuchenbecker**, President of Asbestos & Magnesia Materials Co., has announced the appointment of **P. D. Beaner** as Vice President. Mr. Beaner has been active in the Industry for more than 40 years.

## Obituaries

**Hirsch Epstein**, 53, President of Advance Transformer Company, died after a heart attack in his office on October 8, 1952. Mr. Hirsch joined the Society in April, 1943.

**Robert S. Hopkins**, who was 61, died during November, 1951, the Society has just been notified. Mr. Hopkins, who was the Commissioner of Public Works, Village of Hinsdale, Illinois, became a member of the Society in 1929. During the years of 1940 to 1942, Mr. Hopkins served on the Civic Committee of the Western Society.

**Joseph H. Carr**, 55, died September 8, 1952. Mr. Carr was formerly with the Architectural Office of the Chicago Board of Education. Recently, he was with the Du Pont Company, Wilmington, Delaware. He joined the Society in 1937. During World War II, Mr. Carr held the rank of Lt. Colonel in the Air Corps.

## WSE Applications

In accordance with the By-Laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Associate, Member, Affiliate, etc. All applicants must meet the highest standards of character and professionalism in order to qualify for admissions,

and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office, 84 E. Randolph St., RAndolph 6-1736.

35-52 **Mario Palmieri**, Structural Design Engineer. Sargent and Lundy, 140 S. Dearborn St.

36-52 **Hugo A. Besocke**, Sales Engineer, DeLaval Steam Turbine Co., 122 S. Michigan Ave.

37-52 **Alex N. Betsacon**, Senior Draftsman; Skidmore, Owings & Merrill, 100 W. Monroe St.

38-52 **Fred C. Vernon**, Power Engineer, Public Service Company of Northern Illinois, 159th & Fisk Ave., Harvey, Ill.

39-52 **Louis Woloshin**, Senior Draftsman; Skidmore, Owings & Merrill, 100 W. Monroe St.

40-52 **Frank Baron**, Prof. of Civil Engineering, Northwestern University, Evanston, Ill.

41-52 **Bernt G. Iversen**, Draftsman; Freyn Engineering, Department of Koppers Co., 109 N. Wabash Ave.

42-52 **James N. Lingeman**, 507 N. Kensington Ave., LaGrange, Ill., attending Illinois Institute of Technology.

43-52 **Raymond F. Koch**, Assist. to President, Felt and Tarrant Mfg. Co., 1735 N. Paulina St.

44-52 **Fredrick W. Rys**, Associate Engineer-Operating Mgr., Freyn Eng. Dept., Koppers Co., Inc., 109 N. Wabash Ave.

45-52 **John G. Stemples**, Merchandise Mgr., Lath & Plastering Mtls., United States Gypsum Co., 300 W. Adams St.

46-52 **Charles C. Bray**, Chicago District Manager, DeLaval Steam Turbine Co., 122 S. Michigan Ave.

47-52 **Miss Lillian Stemp**, Safety Engineer & Writer, 630 114th St., Whiting, Ind.

48-52 **Charles C. Curtis**, Assistant Engineer, Public Service Company of Northern Illinois, 72 W. Adams St.

49-52 **Virgil A. Murdock**, Supervisor, Blaw-Knox Construction Co., 930 Duquesne Way, Pittsburgh, Pa.

50-52 **Verne C. Kennedy, Jr.**, Supervisor of Engrg., Streeter-Amet Co., 4101 N. Ravenswood Ave.

51-52 **Wallace W. Webb**, Field Engineer, U. S. Steel Co., American Bridge Div., Erecting Dept., 208 S. LaSalle St.

### Harza Engineering Company

400 W. Madison St.

Chicago 6, Illinois

Telephone RAndolph 6-3451

### MAX M. SALZMAN

Consulting Engineer

SPECIALIST IN INDUSTRIAL BUILDINGS

DESIGN AND SUPERVISION

POWER PLANTS

BUILDING INSPECTIONS

APPRAISALS

53 W. Jackson Blvd.

Chicago 4

**GREELEY AND HANSEN**  
ENGINEERS

Samuel A. Greeley    Kenneth V. Hill  
Paul E. Langdon    Samuel M. Clarke  
Thomas M. Niles    Paul Hansen (1920-1944)

Water Supply, Water Purification  
Sewerage, Sewage Treatment  
Flood Control, Drainage, Refuse Disposal  
220 S. STATE STREET, CHICAGO 4

**MUNCIE CONSTRUCTION CORP.**

Contractors  
for  
Utility Maintenance  
and  
Construction  
Transmission Lines  
Substation  
Distribution Systems  
Plant Electrical  
201½ East Adams Street,  
Muncie, Indiana

**DE LEUW, CATHER &  
COMPANY**

Consulting Engineers

Transportation, Public Transit and  
Traffic Problems

Industrial Plants	Grade Separations
Railroads	Expressways
Subways	Tunnels
Power Plants	Municipal Works

150 N. WACKER DRIVE, CHICAGO 6, ILL.

**RELIABLE**  
Contracting and  
Equipment Company  
**GENERAL CONTRACTORS**

Specializing in  
Underground Construction

100 N. LA SALLE    Central 6-1816

**VERN E. ALDEN COMPANY**  
ENGINEERS

33 N. LaSalle Street

Engineering Investigation  
Engineering Design

## Commerce Department To Exhibit

Technical services available through the United States Department of Commerce will be exhibited at the Conrad Hilton Hotel, November 10, 11, 12, and 13, in Chicago.

The exhibit "Technological Aids to Industry," will show what is being done, and what can be obtained through the Office of Technical Services, the Patent Office, National Bureau of Standards, and Government Patent Board. While details of the exhibit are still in the planning stage, the following type of material is scheduled:

**Office of Technical Services.** File copies of representative reports selected from 250,000 collected by the office; exhibit of products currently being manufactured which were developed from material originated or published by the office.

**Patent Office.** Data on patents and copyrights.

**Government Patents Board.** Data on more than 3,000 government-owned patents available for free use.

**Bureau of Standards.** Products and techniques developed for military use which are available for commercial application.

In announcing the exhibit, Department officials described it as a practical presentation of means for increasing pro-

## APPOINT WSE MEMBER

**James A. Foster**, senior engineer of the Highways and Municipal Bureau, Portland Cement Association, Chicago, has been appointed Assistant Manager of the Bureau effective October 1, 1952, according to an announcement by Carl D. Franks, the Association's Executive Vice President. Mr. Foster succeeds L. M. Arms, who was appointed bureau manager last July.

A graduate of Princeton University, Mr. Foster received a degree of Civil Engineer in 1918. He joined the Association staff in 1936 as a member of the Highways and Municipal Bureau. Prior to joining the Association he served with the Illinois Division of Highways with Consoer, Older and Quinlan, consulting engineers.

Memberships in technical organizations include the **Western Society of Engineers**, the Highway Cost Committee of the Highway Research Board, and the Highway Taxation and Finance Committee of the National P.A.R. (Project Adequate Roads) Committee. Mr. Foster is also a registered professional engineer in Illinois.

duction efficiency, sales, and profits, rather than of theoretical studies of possible products for tomorrow.

Present at the exhibit will be technicians from the above offices who will be available for consultation not only of material being exhibited, but also on the other technical material and services available through the department.

## NASH BROTHERS CONSTRUCTION CO., INC.

Engineering Contractors

1840 South Kilbourn Avenue

Chicago 23

## Engineering Societies Personnel Service, Inc.

New York

Chicago

Detroit

San Francisco

84 East Randolph St., Chicago 1, Ill., ST ate 2-2748

These items are from information furnished by the Engineering Societies Personnel Service, Inc., Chicago. This SERVICE, operated on a co-operative, non-profit basis, is sponsored by the Western Society of Engineers and the national societies of Civil, Electrical, Mechanical and Mining and Metallurgical Engineers. Apply to ESPS, Chicago and the key number indicated. Prepared ENGINEERS AVAILABLE advertisements limited to 40 words, with typed resume attached may be submitted to ESPS Chicago by members of Western Society of Engineers at no charge.

### OVER THE MANAGER'S DESK

Colored leaves, football, and Halloween! This is the season that begins to make us feel like getting back to work again in no uncertain terms. Now is the time to call or write E.S.P.S. for that Engineer you are looking for. If you have been thinking of seeking new employment as an engineer, this is the time of year to get registered with us. We have good men and good positions in our files. Let us not be ghostly about it, so why not make contact in the flesh and let us help you?

B.H.A.

### POSITIONS AVAILABLE

R-9309 DESIGNER ME Degree or equiv. Age: 30 to 45. 5 years exp. in the design of heavy duty off the road drive axles. Knowledge of axles. Knowledge of axle manufacturing procedures. Duties: design and development of off the road drive axles following through the actual production. For manufacturer of tractors. Salary: \$5500 plus. Employer will pay fee. Location: Illinois.

R-9311 PLANT MAINTENANCE ME & EE. Age: 25-40. 2 years plus exp. in maintenance of automatic equipment, conveyors and electrical equipment. Duties: supervise maintenance program for paper converting company. For a manufacturer. Salary: \$7200 per year. Employer may negotiate fee. Location: Chicago.

R-9310 SALES ENGINEER—some technical training. Duties: sales engineering and sales promotional work for manufacturer of power plant equipment, valves and fittings. 1 man for Chicago area, and 1 for Iowa. Salary: Salary and expenses and car.

R-9300 FOUNDRY ENGINEER. Age: 33-45. 3-5 years exp. in designing foundries and/or operations. Good practical foundry background. Knowledge of steel foundry operations. Duties: modernize and mechanize an existing foundry. Preferably one who can speak Portuguese or a Scandinavian language. For a steel foundry. Salary \$10,000 to \$12,000. Employer will pay fee. Location: South America.

T-9299 DESIGNER. Age: 28-35. 2 plus years exp. designing tools, dies, molds, or special automatic machinery. Duties: work on board designing tool dies, and

special machinery for filters, plastics, metal products and other articles. For a manuf. of varied products. Salary: \$600 per month. Employer will pay fee. Loc.: Minnesota.

T-9298(a) PROJECT ENGINEER. College: M.E. Age: to 45. Exp. include min. of B.S. in Mech. Additional grad. study desirable. Min. 5 years research or development exp. required. Research planning, supervision of testing and evaluations to test data. Correlation of experimental data and application to design. Mechanical design of new projectile components. Salary: \$450-\$625. Location: Ohio.

R-9306(b) DRAFTSMEN 2 years plus exp. in drafting refinery construction work. Knowledge pressure and piping codes. Duties: drafting on refinery projects. Salary: \$2.00-\$3.25 per hour. Location: Calumet District. Employer might negotiate the fee.

R-9306(a) CONSTRUCTION ENG. 5 yrs. plus exp. in refinery engineering or refinery constr. Know: refinery processes and piping. Duties: project engineer in complete charge of refinery engineering group. Salary: \$164 a wk. Location: Calumet District. Employer might negotiate the fee.

T-9302 MECHANICAL ENGINEER or DRAFTSMAN. Grad. M.E. Age: 23-40. Prefer M.E. with exp. on heavy machinery but will consider less. Knowledge of drafting—heavy machinery. Duties: drafting under direction of Chief Engineer. Would like man capable of design work if possible. In brief a good "board man." Manufacturer of machinery. Salary: \$4000-\$6000. Employer will negotiate fee. Location: Iowa.

If placed in a position as a result of an Engineers Available or Position Available advertisement, applicants agree to pay the established placement fee. These rates are available on request and are sufficient to maintain an effective non-profit personnel service. A weekly bulletin of positions open is available to subscribers. Apply ESPS Chicago.

### ENGINEERS AVAILABLE

STRUCTURAL DESIGNER MSCE. 29. Sixteen mos. struct. design work reinforced concrete, power plants, and steel mills. Thirty-two months structural design public utilities. Chicago \$6900 481 MW.

MINING ENG. Min. Engr. 24. Fourteen mos. Drafts. layout of steel plants and design of equipment. Six mos. laying and maintenance of track in quarry. U.S. \$5100 482 MW.

CHIEF ENGR. A.E.-Str. Engr. 43. Three and one half yrs. sales mgr. consulting services. Two yrs. designing component parts of trip mill converter building, and railroad repair shops. \$10,400. Midwest MW 483.

SALES ENGR. ME. 30. Thirty mos. in charge of layout, purchasing and checking of offset plates, shipping and inventory control. Two yrs. Prod. Mgmt. trainee. \$6000 Chicago 484 MW.

CHEM. ENGR. Chem. Engr. 27. Six months in charge of production for a soap manuf. \$4300 Chicago 485 MW.

IND. MGMT. ENGR. EE. 27. Twenty mos. field engr., on new sig. corps equip. Two yrs. Methods and processing on communications equipment. Sixteen mos. setting time study rates on radio, refrigerator. \$6000 U.S. 486 MW.

PLANT ENGR. EE. 32. Five yrs. staff engr., providing information for estimates, design, ordering material, and some field checks. Eleven mos. Quality Control Engr., doing spot inspections of telephone equip. \$6000 Midwest 487 MW.

PROD. MGR. 39. Fifteen mos. director labor standards, incentives and methods. Five yrs. responsible for maint. of bldgs. One yr. and one half industrial engr., supervising payroll. Two yrs. Time Study Work. \$6500 Chicago 488 MW.

IND. MGMT. ENGR. IA. 28. Fifteen mos. Sr. Indust. Engr. doing time study, layout, methods, and material control. Twenty-eight mos. standards on printing and bindery equipment, developed data into wage plans and set rates. Chicago \$5000 489 MW.

Charles B. Burdick      Louis R. Howson  
Donald H. Maxwell

**Alvord, Burdick &  
Howson**

**ENGINEERS FOR**

Water Works, Water Purification, Flood Relief,  
Sewerage, Sewage Disposal, Drainage,  
Appraisals, Power Generation

20 N. Wacker Drive      Chicago 6

Telephone: CE ntral 6-9147

Rogers Park 4-1295  
GR eenleaf 5-6960

**CONTRACTING  
AND  
MATERIAL CO.**

**Engineers &  
Contractors**

**EVANSTON, ILLINOIS**  
1235 Dodge Avenue

**THE  
HAINES  
COMPANY**

Ventilation &  
Air Conditioning Contractors  
Sheet Metal Fabricators  
— Welding —

1931 WEST LAKE STREET  
CHICAGO 12, ILLINOIS  
SE eley 3-2765

**QUILTY ENGINEERING CO.**

CONSTRUCTION ENGINEERS

Standardized  
Structural Steel  
for Modern  
Industrial Buildings

Rigid Frame Units  
Bridge Crane Units

**NAPERVILLE, ILLINOIS**

**GRIFFENHAGEN  
& ASSOCIATES**

Consultants in Management  
since 1911



**CHICAGO**

333 N. Michigan Avenue  
RAndolph 6-3686

NEW YORK • BOSTON • WASHINGTON  
MILWAUKEE • LOS ANGELES

**Index of MIDWEST ENGINEER Advertisers**

Abbott Contractors, Inc.....11	Harza Engineering Co.....25
Alden, Vern E.....26	Hunt, Robert W.....12
Aldis & Co.....18	Insurance Exchange Building.....21
Allied Structural Steel.....Cover IV	Jamar-Olmen Co.....11
Alvord, Burdick & Howson.....28	Lyman, W. H. Construction Co.....24
Appraisal Engineering Corp.....12	Morrison Construction Co..... 2
Battery & Childs.....20	Muncie Construction Co.....26
Berthold Electric Co.....28	Nash Brothers Construction Co.....26
Burns, John Struction Co.....10	Quilty Engineering Co.....28
Clay Products Assn..... 2	Ready Coal & Construction Co.....19
Contracting & Material Co.....28	Reliable Contracting & Equipment Co.....26
DeLeuw, Cather & Co.....26	Ronningen Manufacturing Co.....23
Diamond Power Specialty Corp.....16	Salzman, Max M.....25
Durkin, J. W.....20	Sargent & Lundy.....20
Gilbert-Hodgman, Inc.....17	Schweitzer, Wm. E. & Co.....20
Griffenhagen & Associates.....28	Unistrut Products Co.....12
Gritschke, E. R.....20	Zack Company.....21
Haines Company.....28	

**—CUSTOM BUILT—**

**To Your Specifications**

**Switchboards**

**Distribution Panels**

**Benchboards**

**Motor Control Centers**

**Panelboards**

**Junction Boxes**

**Steel Cabinets**

**Raceways**

**Sheet Metal and Light Structural Fabrication**

**Busducts**

**GUS BERTHOLD ELECTRIC CO.**

1716 W. HUBBARD ST.

CHICAGO 22, ILL.

CH esapeake 3-5767

Some hand needs yours



NO OTHER GIFT DOES SO MUCH FOR SO MANY!

COMMUNITY  FUND

.25  
.12  
.21  
.11  
.24  
.2  
.26  
.26  
.28  
.19  
.26  
.23  
.25  
.20  
.20  
.12  
.21



● New parts depot  
and general sales  
district office of  
International Har-  
vester Company at  
Denver, Colorado.

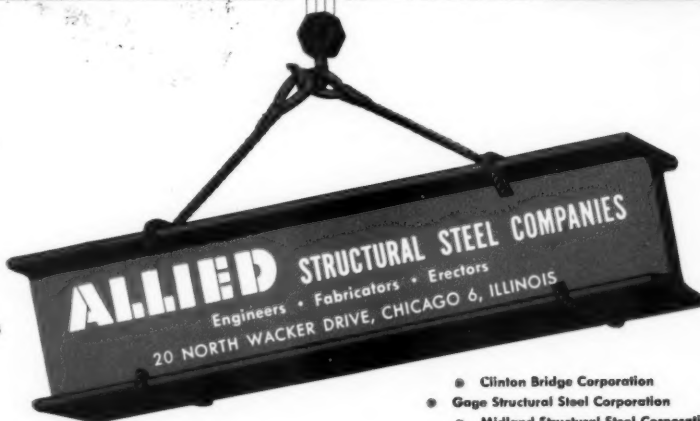
*Send plans and  
specifications  
to Allied to be  
estimated!*

In the three Allied shops, located at strategic points, skilled men and abundant plant equipment are available to fabricate the steel in record time.

On-location erecting crews know how to get the structure up fast.

Every type of structure, from large to small, is an Allied job if fabricated structural steel is specified.

Every time you have such a job, be sure to send your plans and specifications to be estimated.



- Clinton Bridge Corporation
- Gage Structural Steel Corporation
- Midland Structural Steel Corporation

Fabricators and erectors of structural steel for highway and railroad bridges; Industrial, office, school, and government buildings; Airport structures; Harbor facilities.

